COAL AGE

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"Treat men as pawns and nine-pins and you shall suffer as well as they. If you leave out their heart, you shall lose your own." We doubt if we should have had the courage to print this quotation from Emerson, at any other season, but at the beginning of a new year, we, in common with all mankind, are bubbling over with courage.

Emerson was of the opinion that the normal man is a social being; we doubt if any sensible person would disagree with him on this point, however, there are many normal men who lose sight of this fact when they are called upon to deal with others.

Saloons, labor unions, national holidays, pay-day celebrations, all give testimony to "man the social being." Attempts to arbitrarily suppress them altogether give evidence of some one's stupidity.

The miner at work in his room, loading coal, is almost an isolated creature. Compare his surroundings with those of the clerk, the brick layer, the machinist, or most any other laborer. Do you wonder then that he craves companionship when his day's work is completed?

We know of a camp that does not boast of a saloon nor a labor organization, but every afternoon, during the summer months, the men congregate in front of the commissary and play marbles—don't laugh, we are in earnest; name furnished on request. A happier lot of men we have never observed. If all men were possessed of such simple tastes, mining camps as residences could be put in the same class as the Y. M. C. A. Annex.

Between the two extremes—the saloon and the marble club—there are many possibilities, all of them time tested and approved; for example, first-aid teams, prize gardens, reading rooms and night schools, school advancement committees, moving picture shows, old-fashioned picnics, etc., etc.

Oh, yes, remarks the pessimist, you left out "blind tigers." The blind tiger proprietor is at best an outlaw, he never trusts his customers and they seldom trust him. At pay day, while the men are flush, his glasses may ring, but the daily gatherings characteristic of the saloon are wanting.

"Man is a social being." We have never met a person who questioned the truth of that statement. We have met hundreds of men, however, who have never given the matter a moment's consideration, and they are the ones who invariably howl, "down with the saloon," the moment such an establishment interferes with their employees' working capacity; likewise, when the lodge or a labor organization seems to interfere with the output of their mine, they are "agin" them To all such we would point out, as a New Year's suggestion, the possibilities for social activity that lie somewhere (in every camp) between the saloon and the marble club.

If you have reached the stage where you are in doubt as to which substitute for the saloon would be most effective in your camp, you may consider yourself out of danger; it's only the fellow who hasn't realized that there is a substitute, who needs attention.

Ideas and Suggestions

Striking at the Root of Trouble

By Special Correspondence

Although the number of accidents during the past year due to falls, explosions, cars, etc., has been a trifle less than the previous year, considerable agitation has been going on recently to promote still greater mine safety and to reduce the number of future accidents to the lowest possible minimum. The American Mining Congress held at Philadelphia showed that much has been accomplished along this line by the National Bureau of Mines, the mine inspectors and the various coal companies throughout the United States. But it seems that in spite of all our efforts to lessen the dangers attendant on coal mining, our statistics still indicate high accident and death rates.

No other industry has suffered so much as ours and no other industry perhaps has done more to alleviate the hazardous conditions of its operations, which are growing even more dangerous from day to day. The source of our future supply of coal is becoming exhausted, and as we begin to mine the thinner and deeper seams which only a few years ago were scoffed at, the dangers of underground development are considerably increased. Something must be done to stop this annual sacrifice of life, or our death toll will continue to repeat its gruesome tale from year to year.

It matters not how many new safety devices we add to our equipment, how much we improve and increase our supervising forces, or how strict our foremen and mine inspectors may be, unless we strike at the very root of the fault, all our efforts will prove futile and only prolong the termination of a slaughter of over 2300 lives each year.

The Men Higher Up Are Not Altogether to Blame

We have upbraided our mine managers and superintendents, our mine foremen and our mine inspectors enough. We have accused them of every conceivable crime from deliberate indifference to premeditated and willful murder. But when we investigate the matter more closely, our accusations fall flat with shame; for we find that after all, these men higher up are doing their level best to decrease the appalling death rate by promoting the welfare and increasing the safety of the men under their charge. Our trouble does not exist higher up, it lies with the man right at the face of our workings.

It is a well known fact that Michael Angelo Parkoni is the last one to disobey the instructions of the foreman so long as the latter stands by to see that his instructions are carried out. Likewise, it is known that some other Mr. Miner will dress his chamber up quickly upon learning of the approach of the mine inspector. The muffled cry "Here comes the Boss" covers a multitude of sins for which the "Boss" has been severely and unjustly censured.

This is not a defense of the coal operators and superintendents, nor a favoritism to the Department of Mines. It is merely an attempt to analyze a serious situation and then to suggest a solution to the problem we have been trying to solve for many years.

Just as soon as the "Boss" turns his back, the miner almost instantaneously forgets to continue to exercise precautionary measures for his own safety, and thereby subjects himself again to those same dangers that existed previous to the visit of the "Boss." In over 90 per cent. of the cases this carelessness is not altogether due to willful negligence of miners, but to a lack of intelligence that prevents them from thoroughly understanding the surrounding dangers. Or if they do comprehend these dangers they do not know how to overcome them themselves.

The Key to the Whole Situation

At a recent meeting of Pennsylvania Mine Inspectors, Chief James E. Roderick said: "There are too many fatalities. Personally, I feel as though these accidents can be reduced to a minimum. There seems to be entirely too much carelessness and my object is to take some steps to prevent this carelessness and bring the men of the mines to a realization of their own dangers and teach them to be more careful, not only throwing a safeguard about themselves but others who are employed in the mines with them."

"To take some steps to bring the men in the mines to a realization of their own dangers and to teach them to be more careful" is, we believe, the key to the whole situation. If we could adopt some method of systematic and effective educational training that would teach the man at the face to take care of himself and his fellow-workmen properly, in less than three years our accident statistics would dwindle into almost insignificant figures.

The idea of educating the man at the face in order to increase his safety is not a new one. In fact, it has been advocated by many authorities for the past 10 or 15 years. There can be no doubt but that this educational method after all is in reality as well as in theory the best possible method of overcoming the existing dangers in our industry. Its efficacy is indisputable. The excellent results obtained by the various companies from the meager school systems which they recently have established is only an index of the splendid possibilities of this educational work. The company schools, however, though far-reaching in a way, are seriously handicapped on account of being able to do their good work only in a restricted area, and furthermore, they lack pecuniary means. As far as they go, the schools and institutes throughout the anthracite region are doing excellent work; but our foreign classes are few and far apart.

Also, the attendance at these classes is so small in comparison with the number of foreigners requiring instructions that the ultimate good results are hardly noticeable. In other words, the small number of foreigners now being taught is but a drop in the bucket compared

with the large number of foreigners employed in our mines.

One Weakness in Present Plan

Another serious weakness in our present system is the fact that even in the few and small foreign classes that are now in existence, the attendance is in noway obligatory. The importance of this ponit is readily appreciated by teachers and others engaged in educational work. The efficiency of any educational system is directly dependent upon continuity of instruction, wnich in turn involves continuous attendance at classes.

To increase safety and efficiency among our men, then, so far as the miner himself is concerned, the question resolves itself into the following subdivisions:

1. We must educate the foreign-speaking miner. 2. We must bring our schools to him in order to make it as convenient as possible for him to attend. 3. We must demand compulsory attendance for, say, two or three times a week. 4. We must have some reliable source of revenue that will defray the expenses of this educational venture.

This last named subdivision is really the most important part of our problem. Where are we to procure the much needed money to pay our teachers and to run the schools? The answer is, from the state; from the funds obtained by the new anthracite tonnage tax. Last June, the Pennsylvania State Legislature passed an act authorizing a "tax of two and one-half per cent. a ton of the market value of the coal at the mines." This is an entirely new tax over and above and separate from all other taxes heretofore. The income from this tax can be judged from the following:

New Anthracite Tax Nets More Than $4,000,000

According to E. W. Parker in a recent bulletin issued by the United States Geological Survey, the production of anthracite in Pennsylvania in 1912 amounted to 75,322,855 long tons, valued at $177,622,626. This was 6.7 per cent. less than that produced during the year 1911. The foregoing figures will be suitable for rough calculation; therefore, 2½ per cent. of $177,622,626 is $4,440,565.65. One-half of this amount is returned to the counties throughout the state for the use of their several cities, leaving a remainder of $2,220,282.82 for the state.

Now it seems very much within reason to request that a small sum like $500,000 of this two million dollars remaining should be appropriated for the purpose of establishing a thorough and comprehensive school system throughout the anthracite region. It is only fair that this amount should be utilized for the purpose of increasing the safety and promoting the welfare of the workingmen who are the primary factors in producing it. The sum of $500,000 would be enough to start an educational campaign that would soon become an established institution.

To begin with, every public school building throughout the State of Pennsylvania could be utilized for school rooms. In fact, this would be the best plan under any circumstances as our public schools are well distributed throughout the hard-coal field. By holding our classes in these rooms, we would, to a great extent, eliminate the inconvenience and ofttimes the difficulty of traveling long distances to and from school. Perhaps the best instructors to be obtained for this work would be the mine foremen and assistant mine foremen of the various coal companies. It is certain that such instruction would be doubly valuable and highly efficient.

With the aforenamed appropriation as a foundation, with an educational center in each and every county and city schoolhouse, and with compulsory attendance together with competent instruction, there can be no question but that we would soon carry the mining industry from its present hazardous level and lift it to a much higher standard of safety and efficiency.

One Reason Why Workmen Are Dissatisified

By Ernest L. Bailey

Ultimately, the initial step of the American efficiency engineer will be a campaign of popular education in the principles of political economy.

The laboring masses, almost as a unit, are dissatisfied with conditions as they exist, and their feelings are wholly identified with the radical amendment of such conditions.

This dissatisfaction, which of late has spread so rapidly, is not so largely due to any substantial injustice in present-day conditions as it is to the unflagging industry of its painfully efficacious propagandists.

Two Theories for Betterment of Humanity

Philosophers recognize two theories for the world's betterment. One has for its goal the highest ideal of human life, Utopia; the other strives for the immediately useful and practically attainable.

The former, distorted into a sort of lotus eaters' dream of Elysium, and which contemplates the division of the world's goods as a panacea for unhappiness and an end of toil, has come to be the one most commonly accepted by those who work with their hands.

It is an unfortunate fact that, along political lines, these people allow others to do a great deal of their thinking for them, and presented with the arguments of one side of a proposition, are inclined, in the absence of controverting evidence, to accept those arguments as proof conclusive of the correctness of the theory they support; while had the adherents to the opposite theory been nearly so aggressive in presenting their arguments, it is improbable that the present industrial discontent would have had more than a slight foothold, for, given both sides of a question, it is characteristic of a majority of the people to judge aright.

To disabuse the minds of America's workmen of these visionary fallacies and put them back on the bed-rock of sound economics will be one of the duties of the efficiency engineer, for no man will be efficient who views his work in the light of a makeshift against that time when the apportioning committee will hand him out his pro rata share of the world's wealth. No man can be efficient unless he believes in what he is doing, takes a certain amount of pride in his work and enjoys a measure of content at the end of his day's labor.

Why not begin now to present the arguments of your side of the question before the present seeds of discontent have been nurtured into full-grown rebellion?

*Mining engineer, Crumpler, W. Va.

Some Notes on Interior Water Movement of Coal

SYNOPSIS—Nearly 10 million tons of coal a year is shipped down the Ohio River. Due to low-water stages, navigation is only open a portion of the time. Government contemplates an expenditure of 100 million dollars in order to make water shipping possible the year through.

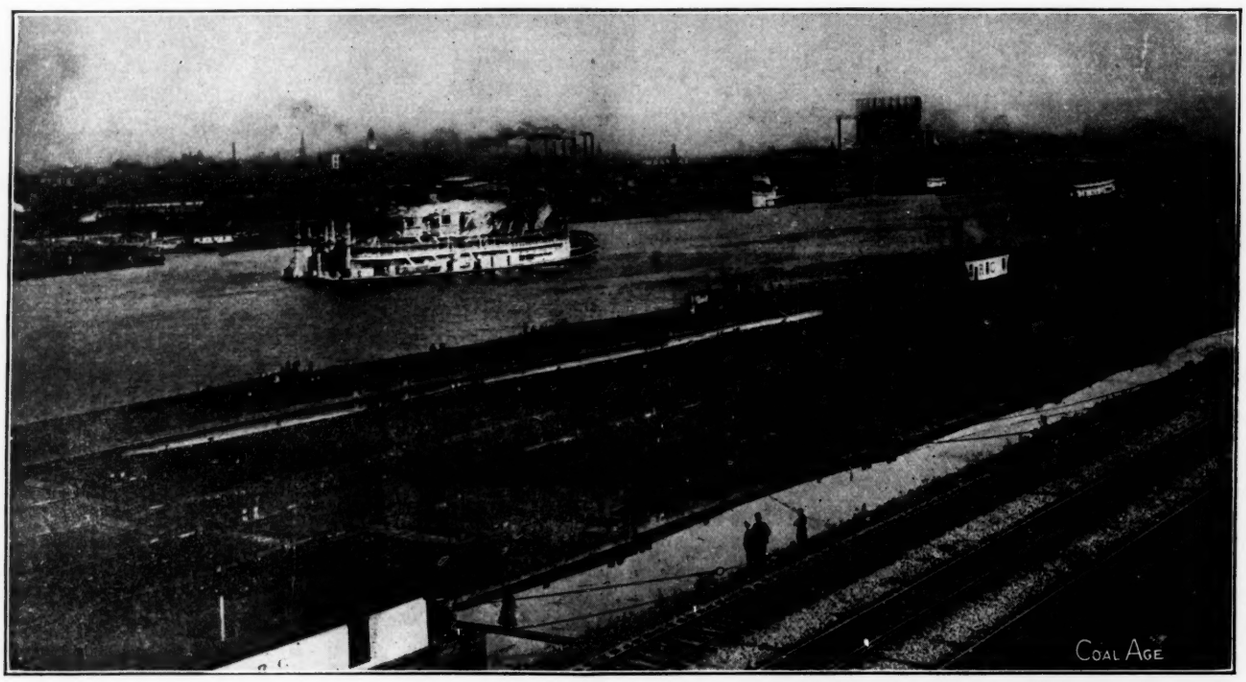
To those who live along the Ohio and Mississippi Rivers, the passing of a boat down (south) with a coal tow is of little interest. When these boats plod their way up-stream (north) still less interest is manifested by those who are not directly interested. But, to the coal operator, the shipper and the receiver, such items mean much. That a coal tow has passed a certain point on its Southern journey is the best news the shipper can receive, excepting, only, the brief wire from the captain that the fleet has been landed safely at Louisville, Memphis or New Orleans.

It is only at certain seasons of the year now that coal is sent from the upper Ohio and Monongahela pools to the Southern markets. The cause of this is simply that a navigable stage of water does not remain in the Ohio River from Merrill, Penn., south, throughout the twelve months. It is just possible that river shipping of coal on the upper Ohio prevails only from seven to nine months during year. This, of course, is because the system of locks the Federal Government is building in the Ohio River is not complete.

From Pittsburgh, the distance down the Ohio to Cairo, Ill., where the Mississippi is touched, is approximately one thousand miles. The Ohio River drains a quarter of the greatest states in the Union, and this importance of the river is one of the reasons that Congress has been so liberal in appropriating millions of dollars annually for the river and harbor improvements. The projects now under way, or the completion of the series of locks and dams will cost upward of $100,000,000. The greatest burden of freight now carried on the Ohio is coal, all coming from Pennsylvania, Ohio, West Virginia and Kentucky.

Importance of the Project

To have a navigable stage of water in the Ohio River during twelve months of the year would mean that the coal shipping tonnage would be more than doubled. Each lock or dam costs upward of $2,000,000 and there will be fifty or more of these between Pittsburgh and Cairo. This will permit a 9-ft. stage of water throughout the entire year, and, it is said, the constant stirring up of the water by coal and passenger boats will prevent the formation of the customary "ice bridge."



Boats Working in Ohio River Pool No. 1 to Get Tows Ready to Start South

Effects of the Opening of the Panama Canal

Time is now drawing near when shipping will be permitted through the Panama Canal. This means that New Orleans will be made a great reloading point for coal consigned to receivers along the Pacific Coast. In turn, it also means that more coal will be shipped out of the western Pennsylvania, eastern Ohio and Kanawha fields for Southern reloading. If the Panama Canal was now open for traffic, it would be impossible to ship coal from the Pittsburgh harbors to New Orleans throughout the year unless the system of locks and dams was completed. Shipping could and would be done at certain seasons of the year, when navigable water would permit, but the completion of the river-improvement program would insure shipping during every week in the year.

Specifications have only recently been presented to Congress asking for an appropriation of about $10,000,000 for work in the Ohio River during the coming fiscal year. All such appropriations are generally agreed to with little if any argument, for the fact is realized that the completion of the 50 or more locks and dams will make the Ohio Valley and its tributary country a beehive of industry, insofar as river coal shipping is concerned.

Basing future shipments of coal by river to Southern points on the records for the fiscal year ending June 30, 1910, when 8,366,786 tons were floated down stream, this volume will be increased 50 per cent. or more when the improvement program is finally completed.

Wages and Prices in the Pittsburgh District

By Jesse K. Johnston*

SYNOPSIS—The coal-mining industry in the Pittsburgh district has raised wages between 62 and 92 per cent. since 1897, and the cost to the purchaser has only increased 54 per cent. The cost of operation of the Pennsylvania R.R. absorbs only about 79 per cent. of the total receipts, but in coal mining, operating expenses involve almost all the gross income.

In view of the fact that the present wage scale for mining bituminous coal in the competitive states expires Apr. 1, 1914, I thought it might be interesting to make a study of the wages and selling prices of coal in the Pittsburgh district for the last 16 years, and to set forth some facts which are misunderstood by the public.

If the coal business could have some assurance during the next two years that actual conditions would be as favorable as today, then there would be no necessity for writing this paper. But in the absence of such assurance if we can know just whither we are drifting in this period of readjustment, reconstruction and legislation, we can better determine what to do, and how to do it.

As one has said very truthfully, "As a whole the coal business is the most indispensable, the most unprofitable, the most maligned, and misunderstood of all the mediums through which the welfare of the people is secured. It is the most important, and most helpless, having in it the power to command, and yet having a nonresistant mass, accepting only with a feeble protest the criticisms of a misinformed public." The public thinks it can cheapen this essential product by destroying that machinery by which it is now being produced at a lower price than anywhere in the world.

Why is it that the great coal industry in the thickly populated industrial districts of Pittsburgh, an industry producing sixty-six million tons of coal in the year 1912 in Allegheny, Washington and Westmoreland counties, is not on a more solid business foundation? On analysis, the answer is, that the cost of production leaves a very small margin of profit for such a large investment, for we must remember that the labor charge is only 75 per cent. of the whole cost of production, there being in addition "overhead costs" and the cost of selling in competitive markets.

One of the statements you hear frequently is that the wages have not advanced in proportion to the selling price of coal, so it is well to nail that statement at once with actual facts.

The Wage Scales in 1897 and 1912 Compared

Referring to the chart and going back to the year 1897, the mining rate in the Pittsburgh district is found to have been 55c. for pick mining lump coal in the thin-vein district; $1.78½ was the maximum rate for day labor and 5c. a ton was a fair cost for materials and supplies. These were deplorable times in the mining industry, and just three years previous to this time. Coxey's Army made its memorable march through southwestern Pennsylvania on its way to Washington.

COMPARISON OF WAGES AND SELLING PRICES

Year	Wages per Ton Lump Coal	Wages per Ton Run-of-Mine	Wages per Day Max.	Wages per Day Min.	Supplies	Average Selling Price Allegheny	Average Selling Price Washington	Average Selling Price Westmoreland
1897	$0.55	$0.3558	$1.78½	$1.52½	$0.05	$0.67	$0.55	$0.85
1898	0.66	0.4272	1.90	1.75		0.71	0.58	0.71
1899	0.66	0.4272	1.90	1.75		0.74	0.74	0.88
1900	0.80	0.5171	2.28	2.10		1.01	0.97	1.04
1901	0.80	0.5171	2.28	2.10		1.00	0.87	1.01
1902	0.80	0.5171	2.28	2.10		1.04	1.03	1.04
1903	0.90	0.5817	2.56	2.36		1.22	1.15	1.18†
1904	0.85	0.5494	2.42	2.23		1.02	0.94	0.95
1905	0.85	0.5494	2.42	2.23		0.96	0.91	0.96
1906	0.90	0.5817	2.56	2.36		1.03	1.02	0.97
1907	0.90	0.5817	2.56	2.36		1.10	1.07	0.99
1908	0.90	0.5817	2.56	2.36		1.05	1.03	0.97
1909	0.90	0.5817	2.56	2.36		1.00	1.00	0.87
1910	0.95	0.6140	2.80	2.49		1.08	1.06	0.98
1911	0.95	0.6140	2.80	2.49		1.06	1.05	0.97
1912	1.00	0.6464	2.95	2.62	0.10	1.09	1.08	1.01
Per cent. advance	81.89	81.69	65.25	71.80	100		53.62	

† Year of anthracite strike.

It was in this year that the 55c. rate was made by the action of the late Patrick Dolan, president District No. 5, United Mine Workers of America, who reduced the wage rate so that the union mines could compete with those of the New York & Cleveland Gas Coal Co. This led to a strike on July 4, 1897, culminating in the interstate convention later, Sept. 13, 1897. The eight-hour day was adopted in Chicago, January, 1898.

Now looking at the record of the year 1912, the last of which we have any data, the rate is found to be in the Pittsburgh thin-vein district $1 per ton for pick mining lump coal. The maximum rate for day labor is $2.95, and 10c. per ton is the cost for material and supplies.

These figures mean an advance of 81.89 per cent. for pick mining. Machine mining has also advanced so that the wage rate for cutting has risen 65.85 per cent., and that for loading after machines 92.29 per cent. The maximum wage for day labor has risen 65.25 per cent., the minimum day-labor wage has increased 71.80 per cent., while supplies now cost twice as much as in 1897. In that year the selling price in Allegheny, Washington and Westmoreland counties averaged 69c. for run-of-mine

*General mining superintendent, Pittsburgh Plate Glass Co., Creighton, Penn.

Note—An article entitled, "A Study of Wages and Selling Prices of Coal in the Pittsburgh District," read before the Coal Mining Institute of America at its winter session in Pittsburgh.

coal, while in the year 1912 this price amounted to $1.06. Thus the average increase was 53.62 per cent.

The Coal Man's Dollar

Loosely speaking, let us call the $1.06 received in 1912 the coal man's dollar, and see how far it goes. A misdirected public opinion is demanding high wages, high taxes, good preparation, safety, compensation, conservation and yet there are not enough of cents in the coal man's dollar to meet all these demands, and allow a fair profit for the investment.

Let us make some comparisons. The cost of operating the Pennsylvania R.R. in 1912, was 78.69c. for every dollar received, and in 1912 that corporation paid only 37.1 per cent. higher wages than in 1900.

On the other hand, the wage rate of mining in the Pittsburgh district increased 51.51 per cent. in that period of time and during parts of 1910 and 1911 a group of mines in the Pittsburgh region, part in the thin-vein district and part in the thick vein, some well situated, some with less favorable conditions, expended for mining, labor, fuel, general office expenses, taxes, depreciation and royalty 99.09c. per ton. Note that this expenditure did not cover interest on bonds.

The average selling price received was $1.09 per ton, leaving a difference of 10c. per ton to take care of dividends and bonded interest, so you see there is not enough left for safety, conservation, compensation and a fair return on the investment.

Is this true of the coal industry? Let me quote you Edward W. Parker, United States Geological Survey, from his excellent paper read before the American Mining Congress, Philadelphia, Penn.:

"Pennsylvania by long odds the most important producer of bituminous coal with an output of 137,300,000 tons in 1909, showed a total expense of $117,440,000, and a value of product of $129,550,000, leaving a balance on the profit side of little over $12,000,000, or about 3⅓ per cent. on the capital invested, which was $358,600,000."

The Consumer Pays for Freight and Thinks He Is Paying for Coal

If you told the consumers of domestic coal that the operators of the Pittsburgh district only received an average of $1.06 per ton for their coal at the mines, or about 4c. a bushel, he would place you in the Ananias Club immediately, for in the mind of the average consumer there is a firm conviction that the coal operators are a lot of robber barons who fix the price of coal at their pleasure.

Now let us analyze the situation, by taking an example during the year 1912. The consumer purchased a car of run-of-mine coal in the Pittsburgh district at $1.10 per ton at the mine. The freight bill would cost him 35c. per ton and the cost of hauling and unloading would cost him $1 or a total of $2.45 per ton. The retail dealer quoted him 10c. per bushel delivered in his cellar or $2.60 per ton. On examination he finds he has paid 15c. per ton for the retailer's profit and also that this profit and the transportation are large items in his coal bill.

The representatives of labor say to the operators of the Pittsburgh district, "If you have not enough business sagacity to get a better price for your coal, it is no fault of ours." The steel manufacturer sells his steel at profit; the butcher demands fair payment for his meat; the shoe merchant gets a good price for his shoes; and the clothier secures a profit for his clothes. Why does not the coal operator get a good price for his coal? What is the remedy?

The Only Efficient Price Raiser

The operators might make a secret agreement to raise the price of coal, but they cannot do this without fear of the law. The railroads have been trying for 5 years to raise freight rates and they have failed because public opinion and the Interstate Commerce Commission have been against them. Who, then, does raise the price of coal? The United Mine Workers of America, who by their compact organization, have been able to secure a large advance in wages during the last 16 years. The question is whether the operators cannot profit by taking some lessons in organization from that aggressive body and by giving the actual conditions of the coal industry more publicity.

We may well question whether the cost of labor in the production of coal has not reached an apex, beyond which we should not allow it to pass until the consumer understands that in the end he must pay for the value of the coal in the ground, and wages of the miner, the cost of safety appliances, compensation, conservation, new laws of taxation and a reasonable profit to the operators.

There is a tremendous waste of investment in coal-mining property, due partly to the antagonistic attitude of the public and partly to the unorganized condition of the industry, and it seems that the business of mining can only be improved by better organization, some efficiency engineering on the selling force, and more general knowledge of the actual conditions under which the coal industry is operating. This publicity might well help to secure some changes in the federal laws.

An American Invention Is Introduced into Great Britain

N. K. Bowman, general manager of the American Mine Door Co., Canton, Ohio, has just returned to this country from a visit through England and Scotland, where he installed a number of automatic ventilating doors for coal mines. Mr. Bowman took occasion to visit a number of his Majesty's inspectors in England and Scotland and found these men especially pleased with the general design of the mine door manufactured by his company. It was found that the "American" mine door fully meets the requirements of the recent British mine law, which provides among other things that trap doors must be so constructed that they will not blow open when the air is reversed. The object of this law is to make it possible to reverse the air in a mine where an accident has happened. It frequently occurs that fire is an element of coal-mine catastrophes, and in such a case, every possible precaution must be taken to carry the poisonous gases away from the main exit, so that the men may have a safe means of escape.

Lignites may be profitably used in (1) Gas producers. (2) Specially constructed boilers. (3) Briquettes. The U. S. Reclamation Service has a boiler at Williston, N. D., that burns lignite untreated, shortly after it is taken from the mine. When lignite is to be used for briquetting it should be thoroughly crushed, then dried until it contains not more than from 5 to 10 per cent. of moisture, then compressed while still warm.

Working a Steep Coal Seam

By Simon H. Ash*

SYNOPSIS—Details of methods employed in mining coal from several seams which lie on a dip of 60 deg. Notes on drawing pillars and timbering. As much as 90 per cent. of the coal is recovered.

The following method of working steep seams is practiced with slight modifications in the different beds of the Pierce County coal measures. At the mines of the American Coal Co., Spiketon, Wash., the beds dip from 60 to 65 deg. Four seams are being worked, Nos. 6, 8, 9 and 10, and the prospects are good for substantially increasing the output in the course of the next year. At present about 500 tons are being produced each day.

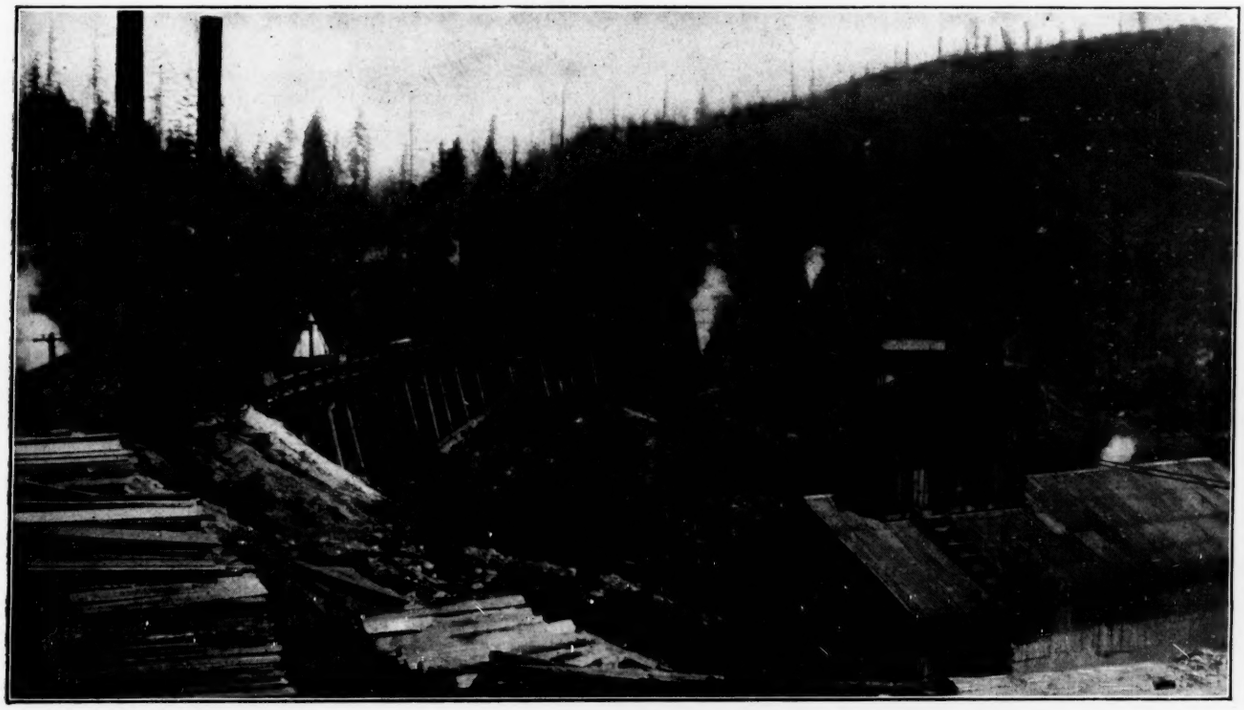


Fig. 1. Yards and Trestle at No. 8 Mine. Also Shows Power House and Washery

The product of the mines is a sub-bituminous coal, which is prepared in three sizes, lump, nut and steam. This coal finds a ready market for domestic and steam purposes in and about the Puget Sound cities. The No. 10 bed, also called the "Lady Wellington," is the best seam now being worked. A slope has been driven across the dip on a grade of 32 deg. to the second level. No. 8 bed was opened in a similar manner, while No. 6 bed has been reached by a rock tunnel driven westerly 670 ft. from the second level in No. 8 seam.

These three beds are of the Burnett series and are on the east slope of the Wilkeson anticline dipping from North 76¾ deg. East to North 67½ deg. East. The average strike is North 15 deg. West. The Eastern measures in this section have never heretofore had an authentic correlation and reliable data for these seams is still lacking. The coal beds in this section are a subdivision of the Eocene period and the coal measures as shown in the columnar section have been determined by survey and tunnel driving for an interval of 2000 ft. Detailed sections of the different coal beds are shown on the columnar section sheet.

The present company has had charge of the property since February, 1912, and much credit is due General Manager D. R. Swem, and Superintendent John Hutchinson, for their consistent efforts to modernize and render safe the company's collieries.

Method of Mining

The coal of the No. 10 bed is 3½ to 4½ ft. thick between walls, a detailed section of which is shown in Fig 5. The coal is mined by the chute-and-pillar system, for the character of the walls is such that mining by wide breasts is impracticable. The coal does not fire spontaneously. With the exception of a few small jumps, the bed has been regular for the entire length of all gangways so far driven. A diabase dike was passed through by a short rock tunnel in the south end of the field, however, beyond this dike, the coal was found in place and regular.

The gangway, which is the intake airway, and the counter gangway, which is the main return airway, are driven parallel. The counter gangway is up the pitch from the gangway and the stumps are from 20 to 25 ft. thick. Chutes are driven 6 ft. wide from the gangway to the counter on 50-ft. centers, from which point they are driven 8 ft. wide up the pitch to the boundary.

The entire mine is driven by contract, same being between the company and the United Mine Workers of

*Mining engineer, American Coal Co., Spiketon, Wash.

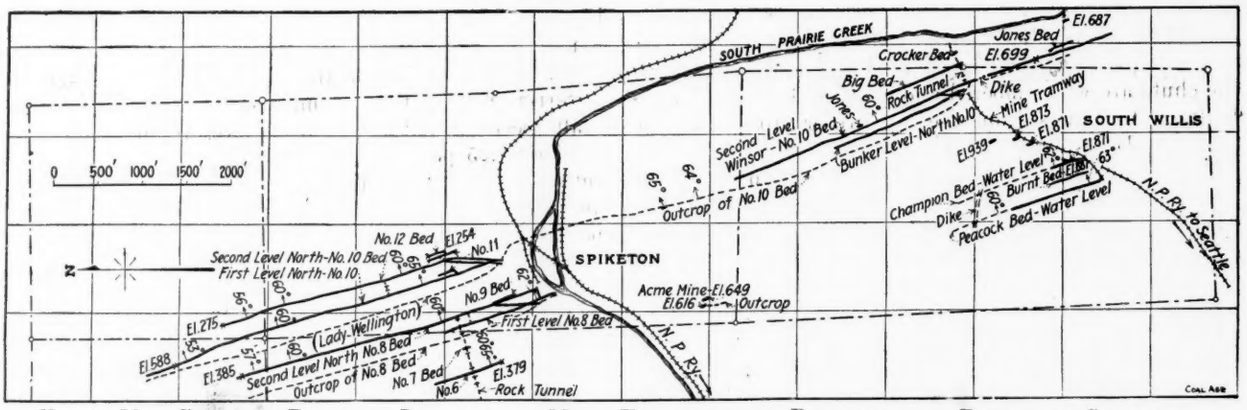


FIG. 2. MAP SHOWING RELATIVE LOCATION OF MAIN ENTRIES WITH REFERENCE TO PRINCIPAL SURFACE FEATURES

America. The distance apart of the crosscuts on the pitch is agreed in the contract to be such that the blocks will not exceed 50 ft. in length, and will be 6 ft. wide. Between every other chute, what is termed a half-chute is driven 6 ft. wide from the gangway to the counter. Where much gas is encountered or conditions warrant such action, half-chutes are driven between all the chutes. Each half-chute is a traveling way between the gangway and the counter, and from it access at all times can be made to two chutes. Hirsch electric lamps are used by the miners in all gangways.

A BRATTICE IS CARRIED UP TO FACE

As shown in Fig. 3, a board brattice is carried from the counter in the center of the chute to the face. The inby compartment is used for the manway. The boards are nailed on the coal side to a line of props up the center

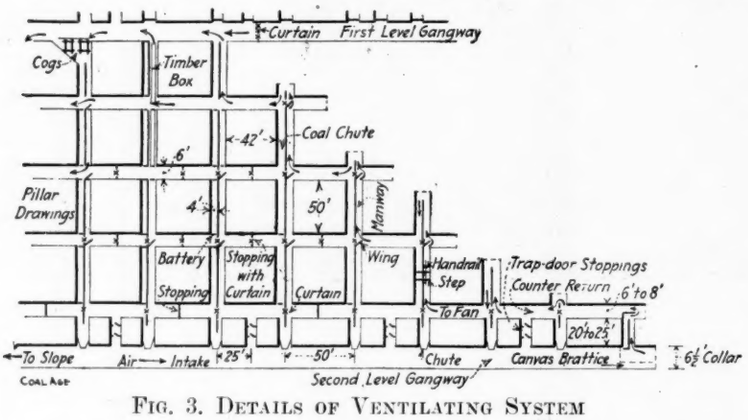


FIG. 3. DETAILS OF VENTILATING SYSTEM

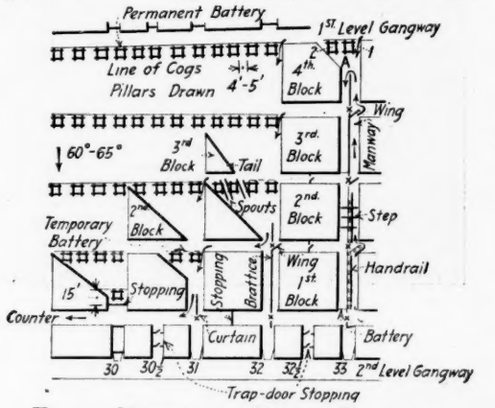


FIG. 4. METHOD OF PILLAR DRAWING

of the chute. These props are set from 2 to 4 ft. apart, depending upon the character of the walls. Hand rails are fastened to the props on the manway side and steps on the bottom are made by placing a prop above the brattice props and placing one end of same in a notch in the rib.

The chute between the low side of the gangway and the counter is always kept full, thus preventing any leakages of air from this source. At every crosscut and on the counter, canvas curtains 2x2 ft. are hung in the brattice; access across the chutes can be made through these openings at all times. At each crosscut, wings are built of boards from the bottom to the roof on the manway side of the chute, the same starting at the chute brattice below the canvas curtain and extending to the wing post set in the center and slightly back in the crosscut. This wing not only deflects the air into the crosscut, but prevents any coal from passing below the crosscut as same runs into the coal side through the canvas curtain. There is also no danger to men who may happen to be coming up the chute.

Batteries are built at every other crosscut and, if necessary, at every crosscut, and the chutes are worked full. This not only arrests the coal and reduces breakage, but aids the ventilation and makes it safe to pass from one chute to another through the crosscuts. A chute starter runs coal from the batteries when necessary.

All shooting is done on the solid. Holes are drilled with the ordinary hand machines and the blasting is done with 20 per cent. Dupont stumping dynamite, a shot lighter firing the holes. Only one miner works in each chute. The average rate of advance in the chutes is 8 ft. per shift.

Because of the heavy pitch, nothing can be gobbed and everything between walls must be taken out and separated at the cleaning plant. Timber is brought down from the surface to the top gangway, to which the chutes from the second level are driven. One of these chutes is used as a timber-way from which props are taken to all parts on the pitch.

DRAWING THE PILLARS

In Fig. 4 is shown the method of pillar drawing. Four chutes are usually driven to the boundary in advance of the pillars, three of which are usually working at one

time. The pillars are drawn on the outby side of the chute as follows: Referring to Fig. 4, No. 30 pillar is finished. When a pillar is to be drawn, the crosscuts of the chute are well timbered and a cog as 1 in 33 pillar is built on the low side of the top lift or crosscut as the case may be.

This cog is placed as closely as possible to the inside rib of the chute. The corner of the block as *A* in the fourth block is then worked off, and as soon as room permits, a second cog as 2 is placed 4 to 5 ft. from the first as shown in drawing. A temporary battery of props is built above this latter cog, to aid traveling across the face and prevent anything from coming down from above and injuring the men below or knocking out the props.

Attacking the block in this manner is called taking off the angles. This is continued until the half of the block is worked off as shown in block 2 of pillar 31, leaving what is called the tail. The same course is pursued on the next block below, as shown in block 1 of pillar 31, after which the tail or half of the block above is worked and run out. When a tail is to be run out as shown in block 3 of pillar 32, part of which has been run out, the temporary battery above the cogs is replaced by the spouts or wooden chutes as the tail is worked off. The coal is then run out between the cogs through the spouts, after which a permanent battery is placed above the cogs.

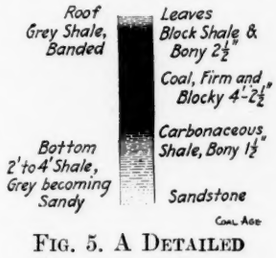


FIG. 5. A DETAILED SECTION OF SEAM

The cogs and the batteries are built of 6-ft. props. In this way the pillars are drawn to the first block from which only an angle is taken off as shown in pillar 30, and a cog and permanent stopping are placed in the chute neck. The arrows show the direction of the air current. Under favorable conditions 2250 sq.ft. of this ground has been taken out in 10 shifts of eight hours each, and as much as 90 per cent. of the coal has been recovered. The roof stands well and the breaks occur above the cog lines and are held up by the cogs. As the coal is being drawn, none of the timbers are knocked out by the shots. Other props are set as the angle face advances.

NOTES ON TIMBERING

The timbers are all cut at the mines, but the lagging used is 1-in. sawed lumber in the chutes and split lagging in the gangway, heavy ground, and in the chute batteries or bulkheads. The gangway sets are made of heavy pole trees, set 6 ft. apart and consist of two legs and a collar above which split lagging or props must be placed to safeguard against the coal roof.

Props are set 3 ft. or more apart, depending on the walls, above which cap pieces are placed if the roof is bad, otherwise they are set in a hitch. They are slightly underset, and if the bottom is bad, sills are used; if not, they are set in a hitch in the bottom.

As the cars are loaded from the chutes on the gangway and the coal spills more or less over both sides of the car, it was considered more economical to depart from the usual custom and place the ditch on the hanging-wall side of the gangway.

Mules are used for hauling the cars on the gangway as the hauls are still short, but these will be replaced soon by mine locomotives. Trips of three or four cars are hauled up the slope. These weigh loaded about one ton.

The agreement with the United Mine Workers of America specifies that all miners not on a contract rate shall receive $3.80 per day. In No. 10 mine, the men receive $3.25 per yd. for chutes, $2.50 per yd. for cross cuts, $5.25 per 90 sq.ft. of pillar removed, $1.25 per cog and $14 per yd. for gangway work. They buy their own powder, fuse, caps, tools, etc. Powder is sold to them at the mines at the rate of $3 per box of 25 lb. of 20 per cent.

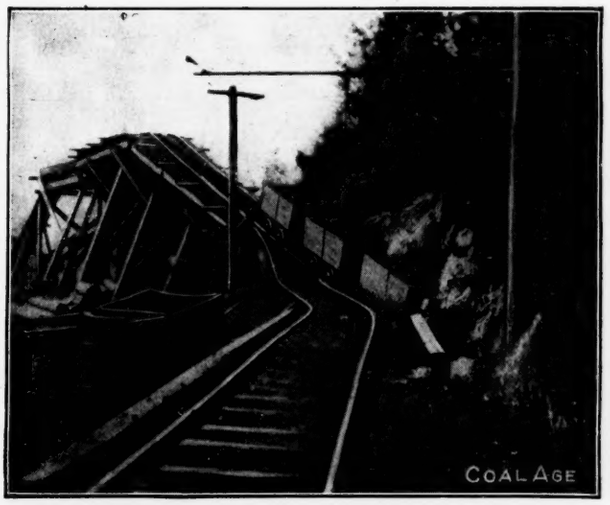


FIG. 6. KICKBACK AT NO. 8 MINE

dynamite, fuse at 60c. per 100 ft., and 5X caps at $1 per 100.

Improvements in the way of preparing and handling the coal are under way, all of which when completed will make a safer and more profitable mine.

An Early Gasoline Engine

BY NEWELL G. ALFORD*

One of the first gasoline locomotives was that furnished by W. F. Prouty to the St. Bernard Mining Co.'s No. 9 mine in the year 1898. It was built either at Newark, N. J., or Philadelphia, Penn., and was installed by Mr. Prouty himself who made a trip to Earlington for that purpose.

It had a 20-hp. engine, which was set upright in the truck and had only a single cylinder and single-chain drive from the engine to the axle. The transmission was very delicate and the motor stalled on reversing. Moreover, the locomotive lacked weight and gave off quantities of smoke, which was, of course, very objectionable. Finally a magneto was put on the engine and when this failed to give the desired result, the locomotive was consigned to the scrap heap. It was used in the mine for about one year, but was never able to pull a full trip of loaded cars.

Erratum

In our issue of Dec. 6, p. 846, the statement was made that the boilers in the Hauto power plant are of the Maxim type. This should have read of the Stirling type.

*Earlington, Ky.

Coal Mining History of Muhlenberg County, Ky.

By Otto A. Rothert*

SYNOPSIS—The west Kentucky coal field was one of the earliest developed in the United States. For years the coal was won without powder. Reminiscences of early mining history.

Coal is Kentucky's greatest natural resource, and the mining of it is rapidly becoming a greater factor in the commercial history of the state. About 30,000 men are now employed in the various coal mines. At present, however, there are three times that number employed by the various manufacturing establishments in the state and nine times 30,000 are connected with farms as operators, managers and tenants. Twenty years ago the number of miners was comparatively insignificant.

Social Conditions in Muhlenberg County

To show the bearing of coal mining on local history I have selected Muhlenberg County in the West Kentucky field as an example. There are now 26 commercial coal mines in Muhlenberg with payrolls amounting to about $2,000,000 a year. This is almost double the amount of the county's agricultural products; tobacco, the leading crop, seldom exceeds $300,000. The county has a population of about 30,000 of which 3500 men are employed in and around the mines. About 95 per cent. of the miners were born in America, of whom one fourth are native Muhlenbergers. About 5 per cent. are foreigners and 25 per cent. are negroes.

Ground for home sites near mines is cheap in Muhlenberg, and, as a result, about 15 per cent. of the miners own the houses in which they live. The percentage of home owners is increasing. This is especially true in and near Central City which is now the largest town in the county and maintains good schools and churches. That the mine owners are interested in the welfare of their people is shown by the fact that at Graham and Luzerne they offer cash prizes to their miners for the best kept home premises, whether these belong to the company or not.

Kentucky Was in the Market before 1830

Tradition has it that about one hundred years ago Alney McLean, who later became a member of Congress, accidentally discovered that the "black rock" found on his farm near Green River would burn. However, wood being plentiful and more convenient, his discovery was regarded as a matter of little consequence. About 1820, his son, William D. McLean, opened up what was known as the McLean drift bank. It is said he was one of the first men to report the existence of coal in western Kentucky.

As early as 1830 a few barges of coal were mined at the McLean drift bank and sent down Green River to Evansville. About that time coal was taken from the Mud River mine and hauled to Russellville in ox wagons, a distance of 30 miles. It usually required three days to make the trip over what is still called the "Old Coal Road." This coal was used by the early blacksmiths who called it "rock coal," thus distinguishing it from charcoal, which, for many years, was the only coal burned in their forges.

The great extent and probable value of the deposits of coal in Muhlenberg was given very little thought by local people before 1854 when David Dale Owen, America's greatest geologist, published the First Report of the Geological Survey of Kentucky. In this book he calls attention to the existence of thick beds of coal in about 25 different places in the county and points out, in a general way, the territory underlaid with coal. The many observations made since his day have added very little to his discoveries, but have merely verified his statements regarding the extent of the field.

Later Developments

By 1875, or a few years after the railroad, which is now the Illinois Central, was built, no less than a dozen mines were in operation in the county along that line, and when, in 1882, the Owensboro branch of the Louisville & Nashville R.R. was completed, more were opened along its tracks. As years rolled on other and larger mines were opened and now the output has placed Muhlenberg at the head of the coal-producing counties in Kentucky. In the meantime, coal lands have advanced from $4 and $5 per acre to $50 and $100.

In 1900, when commercial mines were still comparatively small, producing about 400,000 tons a year, the population of Muhlenberg was 20,000. In 1910 the output reached almost 3,000,000 tons and the population was 29,000, an increase of 45 per cent. over the population of ten years before. Most of this increase was due to mining. During this same period, the increase of population for the United States was 21 per cent. and for Kentucky about 7 per cent.

Hoskinson's Reminiscences

William H. Hoskinson, who all his life long has lived near Mud River mine, speaking of the methods employed there some forty years ago, says:

"Those who are familiar with none but the present methods of mining coal cannot easily realize on how diminutive a scale the old Mud River mine, or any other old coal mine, was formerly worked. In 1871-72, when my father, Jackson Hoskinson, operated this mine under a contract with Hall & Ryan, he put out more coal than had ever before been produced at this place in the same length of time. But there are mines in Muhlenberg county now that produce more coal in one week than did old Mud River during the entire two years of my father's contract.

"Modern methods, as we know them today, were never in use at Mud River. Much coal has been produced here by the light of candles and the old 'Dutch lamps,' but these were displaced long ago by the more convenient de-

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*Louisville, Ky.

Note—Article entitled "Coal Mining and Its Bearing on Local History," read before the Kentucky Mining Institute, Dec. 9, 1913.

vices from which have evolved the present oil and carbide lamps. The drill, needle, and scraper were never seen here until about 1869. Before that time all coal was wedged down.

Slack Separated by Rake and Wasted

A good steel sledge and 5 or 6 steel wedges were among the essentials of a collier's kit; he also had a heavy iron rake, with which he separated his coal, being careful to load nothing that would pass through the teeth. His car was supposed to hold 10 bushels. When it was filled a homemade wooden ticket was attached to it and a 'pusher' pushed it out of the room into the 'lie-way,' where it was coupled to one or two other cars and pulled by a mule to the tipple. Only one mule was used in the mine, and he never went any farther than the 'lie-way.' In fact, small as he was, it was necessary in many places to remove some of the roof or bottom to make it possible for him to reach the 'lie-way.' The track throughout the mine was of wood. For a long time car wheels without flanges were used, the flange, or guard rail, being part of the wooden track. In the course of time these smooth-faced old wheels and the wooden track were superseded by flanged wheels and iron rails.

Early Squib Making

"Blasting powder, it is said, was first used here about 1869. This was the beginning of a new epoch at Mud River, for the churn-drill, needle and scraper soon began to take the place of the sledge and wedges. All the coal was mined 'on the clear' and 4 or 5 in. of powder was considered a good shot.

The little squib now so common was then unknown. In its stead the miners used a joint of wheat-straw filled with gunpowder, which was set off by means of an oiled paper placed under the straw and attached to the coal by a small lump of clay. When I was a boy I made many of these squibs, leaving the joint in one end of the straw and stopping the other end with soap to keep the powder from running out."

Muhlenberg County has an area of about four hundred square miles, all of which is underlaid with coal. However, only about two-thirds of this area, or 270 square miles, is, it is said, underlaid with the coal beds Nos. 9 and 11, which are the thickest seams and practically the only ones now being worked. Each foot of thickness of a bed of this coal is estimated to produce 1000 tons to the acre, and since No. 9 and No. 11 have a combined average thickness of from 10 to 11 ft., these two beds will run, according to this estimate, about 10,000 tons to the acre, or 6,400,000 tons to the square mile, and 1,728,000,000 tons to the 270 square miles. Thus, assuming that the coal is uniform and estimating the output at three million tons per year, these two beds alone could be worked, according to these figures, for about six centuries, or until about the year 2500 A. D.

From experience gained with dust explosions in gaseous mines it appears that undercast air crossings are the best in the more gaseous operations. The distance between the floor of an undercast and the roof of the road it crosses, should be at least 10 ft., though the character and strength of the rock may at times increase or modify this estimate. It is not necessary, as a rule, to line the road above with masonry, though the undercast itself must be carefully lined. The road above acts as a relieving arch to the undercast and takes care of most of the weight of the over-lying strata.

The Dawson Mine Explosion

We called attention some time ago to the fact that electric shot firing has its disadvantages because it creates a sense of security which is not justified in practice. There is always the possibility that a shot may be fired accidentally by a stray current or intentionally by some man who violates the rules. The evidence obtained at the Dawson mine shows the latter has been the cause of at least one disastrous explosion.

Mine No. 2 which was the scene of the disaster was ventilated by an exhausting Jeffrey fan having a capacity of 200,000 cu.ft. of air per min. for a 2-in. water gage or twice that for a 5-in. gage. It was not, the general manager assures us, a gaseous mine though occasionally some gas was found. It was worked with open lights. The chemist took samples of mine air in remote parts of the workings and gobs, and made determinations of their chemical constituents and of the quantity of dust in suspension. The fire bosses made daily tests for gas with the Wolf safety lamp and were under the immediate supervision of the mine inspector.

Electric Shot Firing of Undercut Coal with Permissible Explosives

The coal was all undercut and was shot by permissible explosives only, Monobel Nos. 2 and 5 being employed. About two-thirds of the undercutting was done by hand and one-third by Sullivan and Goodman machines. Electricity was used for haulage, for operating mining machines and lighting main entries.

At 3 p.m., the shot inspectors were accustomed to enter the mine and distribute detonating caps to the men and later they connected the shooting wires. Each entry was provided with a separate switch which was enclosed in a box. This switch was kept locked open until all the men were checked out of the mine. The shot inspectors closed all division switches on their way out as they proceeded to the surface. Finally when it was certain that all the men were out of the mine, the main switch at the entrance was closed. This completed the entire circuit and all the shots were thus fired instantaneously.

The shot inspectors then proceeded into the mine with Wolf safety lamps and noted if there was any fire, missed holes, broken timber or caves. The findings were reported to the mine foreman and any needed action was taken. Water pipes and a complete system for humidifying the mine air were in use.

About 270 men are usually employed in the mine, but 284 were underground when the explosion occurred on Oct. 22, at 2:55 p.m. The men employed were mostly Italians. The explosion killed most of the 261 victims by its direct violence. Few were killed by falls of rock and only 10 to 14 by afterdamp.

The Rescue Work.

The helmets were brought to the mine immediately after the explosion and the rescuers started into the working and had already explored the seventh west entry of the Highline and proceeded to the air shaft before the fan had commenced running. The explosion doors were blown off and the air course leading to the fan was damaged, so that it took one hour and thirty minutes to make the necessary repairs. The fan started at 4:25

p.m. The rescue car of the Bureau of Mines arrived 18 hours after the explosion. The coal companies of New Mexico and Colorado rendered valuable service for which the Stag Cañon Fuel Co. desires to express its thanks and appreciation.

Two helmet men were killed but the exact circumstances under which they were overcome is not known. A small fire was discovered immediately after the explosion which was easily extinguished with water. Another was found later and was put out by fire extinguishers and water. The only places where men were found alive was in the 13th and 14th east entries of the High-line.

The verdict of the coroner's inquest placed the blame on an unidentified miner. Seldom has the cause of an explosion been so certainly determined. The miners were not allowed to fire shots, and it will be noted from the report of R. H. Beddow, state mine inspector that this rule was violated by the man whose carelessness caused the disaster. The remarks follow:

The explosion was caused by an overcharged shot, which was fired in room No. 27 off the ninth west entry in mine No. 2. This shot blew the coal into the gob for a distance of 40 ft., creating much compression and stirring up and igniting the coal dust. The explosion spread from this point all over the mine. The shot-firing wires were traced from the shot back to the first crosscut between rooms Nos. 26 and 27. It then turned into room 26 and was traced to within 50 ft. of the ninth west entry, where it was attached to a cut-in.

The wire then led out of room No. 26 into the ninth west entry and was traced along that heading to room No. 24 where it was connected to the switch convenient to the trolley wire. This switch was also cut in. A piece of copper wire was found wrapped around the trolley wire opposite this switch and a piece of shooting wire, the right length to connect the switch with the trolley wire, was found on the top of a loaded car which stood between the switch and the wire which was wrapped around the trolley wire. An electric detonator was also found on the floor near this switch. It was thus clear that the shot had been fired from the trolley wire.

Efficiency of Portable Electric Mine Lamps

By H. H. Clark*

SYNOPSIS—Formulates a specification for portable electric mine lamps. These lamps must give at all times no less light than a Wolf lamp in perfect order with a one-inch flame. The bulbs must last for 300 hr. and the batteries a full working year of 12-hr. days. The costs of purchase and maintenance and the weight are not considered.

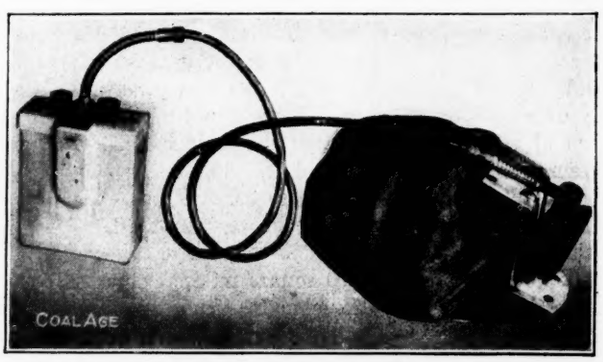
The first requisite of a lamp is the production of light, and for mining service it should burn steadily and with undimmed brilliancy for a certain number of hours of every day in the year. The next requisite is lightness, that is, a lamp should not weigh so much that it hampers a man's movements or becomes a burden to him. The next requirement is that the cost of operation and maintenance shall be consistent with the work done and the benefits received. Another requisite which does not require discussion is that the electrolyte shall not spill or leak while the lamps are in use.

Weight, Cost and Capacity

If we assume that this last mentioned requirement does not need further consideration, we can group the qualifications of portable electric lamps under three main heads as follows: Weight, cost and capacity.

The weight of a lamp can be easily ascertained and each prospective user of a lamp must decide for himself whether or not its weight is excessive. Under the head of cost would be included the first cost of the equipment, as well as all proper charges for operating and maintaining the lamp. Some of these charges will vary with each installation and whether or not the cost is excessive will depend somewhat upon the conditions which surround each case.

The capacity of the lamp is taken to mean its ability to produce a certain amount of light for a definite number of hours per day, every day in the year if need be. A lamp that can do this with the fewest interruptions has the greatest capacity for performing the duty for which it is intended. The capacity of a lamp as thus defined takes into consideration not only the ampere-hour



The Wico Cap Lamp

capacity of the battery and the efficiency of the lamp bulb, but also the life of battery plates, the mechanical strength of parts and the resistance to wear and tear.

We need to define (1) what is the proper amount of light for a lamp to give; (2) the proper time it should burn each day, and (3) what are reasonable interruptions of service and how often they may occur.

The Proper Amount of Light in Lumens

To measure truly the illuminating power of a portable

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Note—Final part of paper read Dec. 5, 1913, at the winter meeting of the Coal Mining Institute of America.

electric lamp, we must consider not only the intensity of light (or candlepower), but also the solid angle over which the intensity is maintained. A lamp which gives an intensity of light of one candlepower all around gives twice as much light as one which gives a light of equal intensity half way round it. The term "flux" is used by illuminating engineers to designate the product of intensity and the angle over which it is exhibited, since this product most truly represents the light which flows from the lamp. The unit of flux is called a lumen and is about $^{8}/_{100}$ of the total flux of light produced by a source of one spherical candlepower.

The term candlepower used without qualification is not only confusing but really meaningless. If all sources of light distributed light equally in all directions, then a single measurement of their candlepower would suffice to compare them. Practically, however, sources of light differ a great deal in the way they distribute light, and this is especially true if reflectors are used.

The Average Candlepower

Therefore, if a lamp is stated to give two candlepower, the statement should also explain whether "head-on" candlepower is meant, or average candlepower over the stream of light, or average candlepower in a given plane —such as, for instance, the horizontal. A lamp that uses a reflector may have a "head-on" candlepower 3 to 10 times the average candlepower over its entire stream of light. Generally it is best to state the average candlepower of a lamp instead of the candlepower at a single point or group of points.

A statement of the candlepower of a lamp does not sufficiently define its light-giving capacity. A 100-cp. lamp is seemingly 33 times as desirable as a 3-cp. lamp and yet a 100-cp. lamp shining through a hole ½ in. in diameter gives less actual light and much less useful light than a 3-cp. lamp shining through a hole 3 in. in diameter. Therefore, in order to define properly the light-giving capacity of a lamp, a statement must be made regarding both the candlepower and the total flux of light (or lumens) produced by the lamp.

The selection of proper lower limits for intensity of light and its flux is, aside from safety, the most important consideration in selecting portable electric lamps. Without these standards of reference accurate and intelligent comparison of lamps is not possible. In an attempt to establish such lower limits the bureau searched for some time for standards which should be fair, not too low in value, not arbitrarily selected, and which should bear an easily recognized relation to something already in use.

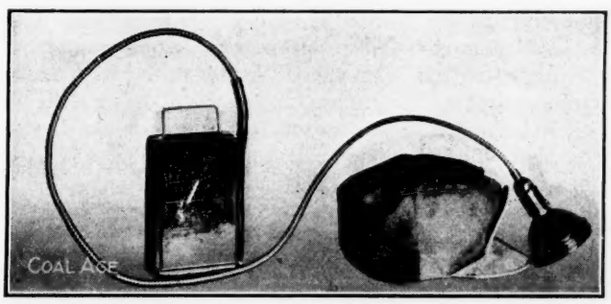
The Specifications Require Lamps Must Give at Least as Much Light as Wolf Safety Lamps with a Clean One-Inch Flame

It was finally decided to prepare a standard Wolf safety lamp to give its best performance and, after adjusting the flame height to 1 in., measure the average intensity of the stream of light and also the total flux of light in the stream. This was accordingly done at two different times, using different lamps, prepared by different men, and tested with different instruments of different types. The first measurements were made by Dr. L. O. Grondahl, of the Carnegie Institute of Technology, and the second measurements I made myself. The results of the two tests checked within a very few per cent.

The lamp used was a Wolf miner's safety lamp, 1907 model, round burner, burning 70-72° naphtha, and prepared and trimmed in accordance with the standard practice of the Bureau of Mines. The average intensity of light stream, as determined by these tests, was a trifle under 0.4 cp. and the total flux of light was found to be not quite 3 lumens.

Lower Limit of Cap Lamps Half That of Hand Lamps

The bureau therefore concluded that a satisfactory lower limit of flux of light for hand lamps would be 3.0 lumens and a satisfactory lower limit of average intensity would be 0.4 candlepower.



The Hirsch Cap Lamp

The bureau suggests that lamps designed to be worn upon the cap should give the same intensity of light as that required for hand lamps, but that the minimum flux of light required from cap lamps should be not more than half the minimum demanded from hand lamps, because when a lamp is worn upon the head any light that is thrown to the rear is wasted. If the equivalent of a safety lamp were mounted upon a man's head, one-half of its light would fall behind the man and thus could not be used. Therefore the bureau concluded that 1.5 lumens would be a satisfactory lower limit for the flux of light produced by a cap lamp.

Proper Time of Burning per Day

Twelve hours was selected by the bureau as a reasonable time of burning. This length of time was chosen after consultation with several people outside of the bureau, who were competent to express an opinion in regard to the subject.

The necessary daily time of burning of a lamp will not be everywhere the same, but when everything is considered, 12 hr. does not seem to be unduly long. A lamp should be able to give the required light up to the time when the exhausted condition of its battery requires that the discharge be stopped lest the battery be impaired. Therefore, at least an hour of burning should be allowed over and above the usual requirements of the miner in order not to push the battery too hard in an emergency and to allow for possible incomplete charging.

Deterioration of Electrolyte, Lamp Bulbs and Battery Plates

The only interruptions of service that can be regarded as reasonable are those incident to the renewal of such parts of the equipment as have an admittedly limited life, such as electrolyte, lamp bulbs and battery plates. The interruptions incident to changes of electrolyte need not

seriously interfere with the service of the lamp and it hardly seems necessary or desirable to place a limit on the frequency of such interruptions. The failure of lamp bulbs will not cause an appreciable interruption of service if the bulbs are changed when they grow dim and are not allowed to burn out altogether. The bureau believes that it is not unreasonable to require 300 hr. of actual service from each lamp bulb.

The most serious of the allowable interruptions of service will be caused by the failure of the battery plates. The bureau believes that it is not unreasonable to require of each battery plate the equivalent of 3600 hr. of actual service in 12-hr. shifts, when the service is completed within one year from the date of beginning.

Failure of Lamp Cord and Other Attachments

Interruptions in the service of cap lamps are also to be expected from the failure of the cord which connects the battery with the head piece. Although a reasonable time-of-service requirement can be placed upon this part of the equipment, there is no way other than actual service to determine whether or not a cord complies with the specifications. Any tests which might be suggested would be arbitrary in character and might be too severe, or too lenient.

Interruptions of service other than those just mentioned may be regarded as unreasonable and as reflecting upon the design and construction of the lamp equipment. Among such interruptions may be mentioned those resulting from failures of terminals and leads, battery jars, battery casings, contacts, etc., as well as any failures of bulbs or plates that occur before their specified time of service has expired.

It is manifest that every time a lamp bulb, a battery plate, or a cord is renewed, the cost of maintenance is increased. Therefore, from the standpoint of cost as well as from that of service, it is desirable that even reasonable renewals should be as few as possible.

The following specifications for the minimum performance of portable electric mine lamps are offered by the bureau for discussion and criticism:

BUREAU OF MINES SPECIFICATIONS FOR PORTABLE ELECTRIC MINE LAMPS

The values stated are suggested minima for the items against which they are written

1.	Safety	100 per cent.
2.	Intensity of light at all times	0.4 cp.
3.	Flux of light at all times: For hand lamps	3.0 lumens
	For cap lamps	1.5 lumens
4.	Time of burning per charge	12 hr.
5.	Average life of bulbs (Not more than 5 per cent. to have less than 250 hr. life)	300 hr.
6.	Average life of batteries	3600 hr.
7.	Variation in current consumption of bulbs,	10 per cent. from average
8.	Distribution of light	not here stated
9.	Angle of reflector	100 deg.
10.	Mechanical and electrical construction	first class

Further Explanation of the Specifications

The safety requirement is intended to cover freedom from gas ignition and from premature extinction. The bureau believes that lamps that have passed its tests and have been approved as permissible for use in gaseous mines will satisfy the requirements of safety. Where cap lamps are employed, the light stream, from which, occupies a solid angle of more than 180°, the flux of light shall be increased in proportion to the increase in the cross-section of the light stream.

Time of Burning

The time of burning, as stated here, is taken to mean the time during which the discharge voltage exceeds the lower limit established by the manufacturers, and the lamp is producing not less than the specified flux of light at a mean intensity of light not less than 0.4 cp.

Distribution of Light

Any requirement as to the distribution of light will, of course, apply only to lamps that use reflectors of some kind. No value is given in the table to this qualification because an intelligible statement requires considerable space. It is clearly desirable to have a uniform distribution of light and yet to make this requirement too rigid would entail unwarranted expense. The following is suggested as a reasonable specification which will preclude uneven distribution of an annoying or inefficient character:

The distribution of light shall be determined both by observation and by photometric measurement. The lamp shall be placed 3 ft. away from a plane surface which is perpendicular to the axis of the light stream of the lamp. When so placed the lamp shall illuminate a circular area not less than 7 ft. in diameter. All observations and measurements of distribution shall be referred to this 7-ft. circle, regardless of how large an area the lamp may illuminate.

The Ceag Hand Lamp

As observed with the eye there shall be no "black spots" within that circle nor any sharply contrasting areas of bright and faint illumination anywhere. As measured photometrically the distribution of light diametrically across the circle shall fulfill the following requirements:

The average illumination (in foot-candles) on the best illuminated $\frac{1}{10}$ of the diameter shall be not more than twice the average illumination throughout the diameter and, for at least 50 per cent. of the diameter, the illumination shall be not less than the average.

Reflector Angle

This refers, of course, to the solid angle of the stream of light. A reflector whose cone of light has an angle of 100 deg., will illuminate a circle about 7 ft. in diameter if placed 3 ft. away from the surface so illuminated.

Mechanical and Electrical Construction

It is not necessary to suggest to mining men that anything should be well made if it is to be used underground. Under this head should be considered simplicity of design, strength of parts and fastenings, design of moving and removable parts, and the design and construction of electrical circuits and contacts.

Secretary F. K. Lane on Public Coal Lands

SYNOPSIS—The report of Franklin K. Lane, Secretary of the Interior, to the President on the public coal lands and immediately allied subjects. He declares that Alaskan affairs should be administered by a board of appointed officials, that coal lands should be leased, not sold, in both the West and in Alaska, and that the present system of selling is inoperative and based on mere guesswork.

The largest body of unused and neglected land in the United States is Alaska. It is now nearly half a century since we purchased this territory, and it contains today less than 40,000 white inhabitants, less than 1000 for each year it has been in our possession. The purchase was made as a means of protection against the possible aggression of a foreign nation and without the hope that it would be even self-supporting. In the intervening 46 years we have given it little more than the most casual concern, yet its mines, fisheries and furs alone have added to our wealth the grand sum of $500,000,000.

We have withdrawn Alaska from the too aggressive and self-serving exploiter. What have we to substitute as a safer servant of public interest? To this question I have given much thought, and my conclusion is that if we are to bring Alaska into the early and full realization of her possibilities we must create a new piece of governmental machinery for the purpose. We should undertake the work in the spirit and after the method of a great corporation wishing to develop a large territory. In my judgment the way to deal with the problem of Alaskan resources is to establish a board of directors to have this work in charge.

POWERS OF BOARD OF MANAGEMENT

Into the hands of this board or commission I would give all the national assets in that territory, to be used primarily for her improvement—her lands, fisheries, Indians, Eskimos, seals, forests, mines, waterways, railroads—all that the nation owns, cares for, controls or regulates. Congress should determine in broad outline the policies which this board with liberal discretion should elaborate and administer; the board having powers similar to those enjoyed by that in the Philippines. This board would, of course, have nothing whatsoever to do with the internal affairs of the organized territory of Alaska, for it would exercise no powers save such as Congress granted over the property of the United States in Alaska.

There are several reasons which appeal to me as supporting this suggestion:

1. Such a board could advise Congress as to what should be done, without prejudice, out of a deep national interest and with firsthand knowledge of conditions.

2. Such a board would coördinate the present enterprises of the Government in Alaska. As it is now, the control of lands is in one department, of forests in another, of roads in another, of fisheries in a fourth, of railroads in still another. The care of black bear is in one department and of brown bear in another.

ABSENTEE GOVERNMENT

3. There can be no satisfactory administration of land laws nor any other laws at a distance of 5000 miles from the point of action. Much less is this possible where the two sections of the country are separated by an ocean and the land calling for attention is closed to the world one-half of the year. The eye that sees the need should be near the voice that gives the order.

4. Alaska's opening and improvement should be treated as one problem. Each step in such an administration should be part of a plan, not an isolated act. We should have a unified and consecutive program, based on immediate knowledge, governing this work. Each line of activity within the territory should be correlated with all other activities. The opening of lands and the building of railroads or wagon roads, for instance, should be part of one scheme.

RIGHT TO ITS OWN REVENUES

5. Alaska should be developed so far as possible out of her own revenues and resources. She should have a Federal budget of her own. Her revenues and expenditures should be presented to Congress on a single sheet. The funds raised from her lands and fisheries, her furs, her forests, and her mines should be used for the construction of her roads, railroads, telegraph and telephone lines, or for any other purpose which would make her resources more quickly available to the world. I believe it could be shown that Alaska is self-supporting today, or, what is more to the point, that by proper taxes and charges imposed upon those who are deriving large return from their enterprise in the territory, such revenue could be derived as would support a large policy of expansion and improvement.

The members of such a board appointed by the President would be selected presumably with reference to their fitness for the work to be done. Each one could be made the administrative and residentiary head of a department or division, so that there might be a commissioner of the Alaskan land office, another commissioner of highways, another, perhaps, commissioner of Indian affairs and fisheries, and so on. All would sit together, as in the commission form of municipal government, and would work for a common end, the upbuilding of Alaska as an integral and contributing part of the Union.

I apprehend the fear that with such a commission there would be danger of corruption or indifference creeping into its work. This, however, is incident to the bestowal of all authority. The commission would not go unchecked, of course, for it must report to the head of some department at Washington, and through that head to Congress, and would be always subject to investigation. Moreover, no method has yet been invented by which dishonesty or poor judgment can be guarded against in public or in private life. In the end the character and wisdom of the men appointed is the only insurance that can be given against conduct that is foolish or worse.

Alaska should not, in my judgment, be regarded as a mere storehouse of resources upon which the people of the States may draw. She has the potentialities of a state. And whatever policy may be adopted should look toward an Alaska of homes, of industries, and of an extended commerce.

Strongly as I would urge this method of management—for it offers a rare opportunity to exhibit the efficiency of a Republic—I would not have Alaska wait for needed legislation until the merits of such a plan could be passed upon by Congress. Those things which appeal to me as of immediate necessity upon which independent action may be taken are (1) the construction of railroads in the territory and (2) the opening of her coal lands.

ALASKAN RAILROADS

I have already expressed to the Congress my belief that it was wise for the Government itself to undertake the construction and operation of a system of trunk-line railroads in Alaska. And I am led to this view irrespective of the possibility of private enterprise undertaking such work, although my belief is that no railroads would be privately constructed in Alaska for many years to come excepting as adjuncts to some private enterprise. Be that as it may, it would seem wise for the Government to undertake this task upon grounds of state. The rates and the service of such railroads should be fixed with reference to Alaskan development—not with regard to immediate returns. The charges fixed should be lower for years to come than would justify private investment. I would build and operate these highways in the same spirit that the countries or the States build wagon roads—not for revenue, but for the general good.

ALASKAN COAL LAND

It is not necessary to set forth here the extent or character of the coal fields of Alaska. Neither could I add to your knowledge or that of Congress as to the need for this coal both by the Navy and by the industries and the people of the Pacific coast generally. There are almost unlimited quantities of a high grade of lignite in the interior which may not stand extended storage or transportation. This could be converted into electricity at the mouth of the mines and widely distributed for lighting, heat and power. Toward the southern coast of the peninsula there are two well known fields of a high-grade bituminous coal and some anthracite. These are the fields which have given rise to the troubles with which all are familiar.

These coal fields should be opened not to speculation, but to operators. Those should have these lands who will use them. None should be opened as a basis for a gamble in future values. If these premises express a sound public policy, there appears to me but one conclusion that can be

reached as to the manner in which they may safely be turned over to the public—under a leasing and royalty system similar to that under which the state of Minnesota leases its ore lands and the states of Montana and Colorado their coal territory.

EACH LEASEHOLD 2600 ACRES

The tracts opened should be disposed of to those who within a certain time would develop mines and make their product commercially available. This means that where a railroad is necessary to the operating of a mine the applicant should take a lease so conditioned for a limited period. Sufficient land should be leased as a body to justify long-continued and economical operation. As the average of all operations in the United States is 2600 acres, including many small holdings, this might be taken as a maximum unit.

There has been much dispute between those who favor making a lease for an indeterminate period, dependent alone upon continued operation, and those who believe it wisest to fix a term for the lease, 20, 30 or more years. This dispute seems to me of much more academic than practical interest. There should be no disposition to change the lessee. If a fixed term of leases is decided upon, the original lease should have an assured preferential right to a renewal until the mine is worked out. So that in the end the fixed term is a reservation of the right on the part of the Government to make new terms at the end of a number of years, a reservation which could be fixed in an indeterminate lease.

A fixed minimum annual royalty would conduce to operation and prevent the holding of lands out of use. These are matters, however, of regulation upon which much thought should be expended, and the experience of other lands will be found helpful. If the principle of the homestead law is adopted, and one lease only permitted to any one person or group of persons, and all leases made nontransferable, excepting with the consent of a designated authority, it would seem that monopoly could be prevented. I would, however, add one other precaution—that in each field a large body of the coal land be reserved, so that the public and the Navy might be rendered independent of private supplies if that should become necessary.

ADVANTAGES OF LEASEHOLDS

The attraction of a leasing system is that it enables an operator to put all of his capital into the promotion of his enterprise, no investment being needed for the purchase of the land. This makes it possible for the man of comparatively small means to become a coal-mine operator. The lessee is pleased to pay the Government a royalty in lieu of tying up a large amount of capital in the land itself.

There is this further consideration, which those interested in Alaska's future might well consider. The royalties arising from these mines (as well as from oil) would for a long time be a source of revenue to the Government. To stimulate the opening of mines, all royalty might well be waived for a br'ef period; later, however, these royalties would be a not inconsiderable addition to the resources available for Alaskan development, for I would think it the wisest policy to give to this new land the full return from her properties to be used in her improvement, at least for many years.

There are many isolated places in Alaska where small mines may be opened to supply a local and restricted need. A license to mine a small acreage without any charge whatever on the part of the Government would meet this demand.

WESTERN COAL LANDS ARE NOT SELLING

It might be well at this point to consider the coal-land situation in the Western States. For the policy I have suggested as advisable to apply in Alaska I think the sensible policy to adopt throughout the rest of the country. We have tried two experiments in the United States as to coal lands. We allowed our coal lands to slip from us under the old land-is-land policy until we came into the presence of a coal monopoly or a ser'es of such monopolies in various parts of the country. If this is questioned we may at least say, with exactness, that we realized that we had been putting priceless assets into the hands of a comparatively few far-sighted men for an inconsiderable consideration. Then we tried the other plan of appraising such properties on a scientific estimate of contents upon which the land is sold. This is the present plan, and it is really nothing more than a demand for a full but discounted royalty in advance. It has against it, in my opinion, at least two objections. Our coal land is not being used under this plan save under exceptional conditions of local and immediate demand, and the purchaser, when there is one, is speculating on the best guess that an honest geologist can make as to the amount of coal in the ground.

The outstanding withdrawals of public lands valuable for mineral fuels and fertilizers or in connection with the water resources of the public domain now aggregate 66,000,000 acres. The coal-land withdrawals awaiting classification constitute the larger part of this acreage, being 56,316,410 acres on Dec. 4, not including the blanket withdrawal of coal lands in Alaska. It is noteworthy that a larger area than this has been restored within the past five years, and nearly 20,000,000 acres have been classified as coal lands and are open to entry at appraised prices. The lands classified and restored by Executive order to appropriate entry since Mar. 4 last, total 10,000,000 acres, every restoration being based upon careful consideration within this department. About 400,000 acres of mineral lands in the same nine months have been withdrawn.

COMPETITION INVOLVES WASTE

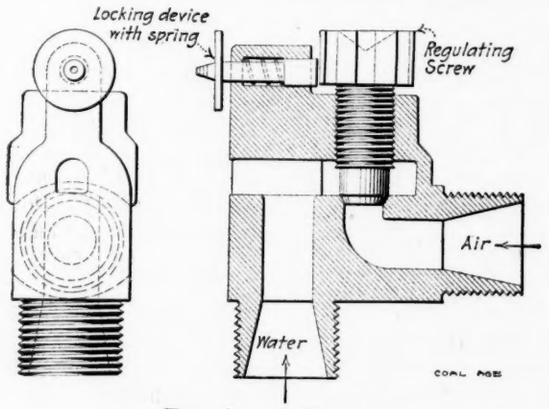
It is certainly not for the public interest that our coal deposits shall be opened rapidly and ruthlessly. We may reforest lands that have been devastated, or feed again into fruitfulness a soil that is starved, but we cannot replace the carbon deposits underground once they are removed. I cannot, however, feel that we should sacrifice any present need for fuel or willingly surrender ourselves to a demand for exorbitant prices because of a fear that some day the coal supply may be exhausted. Already there has been developed a substitute for coal in the flowing stream. The turbine converts melted snow into heat and light, which can be distributed over a constantly widening area.

I think we have now arrived at that point in scientific achievement which justifies the belief that the wheels of industry will not cease, nor our houses go unlighted or unheated, so long as dams may be built upon our streams. Water will be, indeed already is, the greatest conservator of coal. We must seek to make use of our coal, the fullest use that society requires. This principle seems a truism. But here lies the difficulty. We wish cheap coal and at the same time a minimum of waste. We wish society to take the lion's share of the profit and yield no more to the operator than will make his work sufficiently attractive to keep him at it. In short, we desire competition without waste, a frank impossibility.

Other countries have wrestled with this problem. Some have gone into Government operation. But those who are nearest to us in institutions and tendencies have found that in a new country where there must be large development and higher rewards for enterprise, the safest practicable method is to lease the land, the Government taking a modest royalty and retaining some measure of control over operation.

A Water Spray for Drills

Considerable attention has been paid recently to the danger to which a miner is exposed in breathing in air laden with stone dust when engaged in drilling through hard rock. Such inhalation of stone dust may cause serious lung trouble. It is interesting, therefore, to learn that the Hardy Patent Pick Co., Ltd., of Sheffield, England, is fitting on some of its drills an ingenious form of water spray which avoids the danger of the dust-laden air.



THE SPRAY NOZZLE

This arrangement is both simple and efficient. It is attached to the air pipe of the drill, and the escape of air through a minute independent outlet sucks up and atom-

izes a small stream of water, projecting the latter as a fine spray into or across the hole being drilled. In this way practically all the dust formed by the drill is successfully allayed.

Water under pressure is not required and hence an ordinary bucket is all that is needed in the way of a receptacle. One pail of water is found sufficient for 8 to 10 holes in ordinary material. By a regulating screw and spring-locking device, the amount of spray can be easily adjusted to meet all requirements.

Coal Freight Rates from the Hocking District

While the Ohio legislature, ably seconded by the Govenor has been busily engaged on drastic legislation, adverse to the operating interests in the state, we are pleased to note that the state officials are as vigorously championing the cause of the local trade against foreign intrusion. Thus we note that alleged discrimination by the Hocking Valley R.R. against Ohio coal shippers, in competition with West Virginia operators has been taken in hand by Governor Cox. He has ordered the public-utilities commission to take immediate action in fixing a rate which will, if possible, enable operators of the Hocking Valley district to compete with the West Virginia mines.

According to Senator J. B. Dollison, of Logan, who conferred with the Governor, many mines in the Hocking district have been closed down because they are unable to compete with West Virginia, by reason of discriminatory freight rates. The rate per ton from Nelsonville to the docks at Toledo is 80c. according to Senator Dollison. West Virginia coal, delivered to the Hocking Valley by the Kanawha & Michigan R.R. at Armitage (a 12 miles further haul than from Nelsonville) is carried to the Toledo docks for 40c. a ton. Thus for a 12 miles shorter haul, the Hocking Valley charges the operators 40c. more per ton than the West Virginia companies.

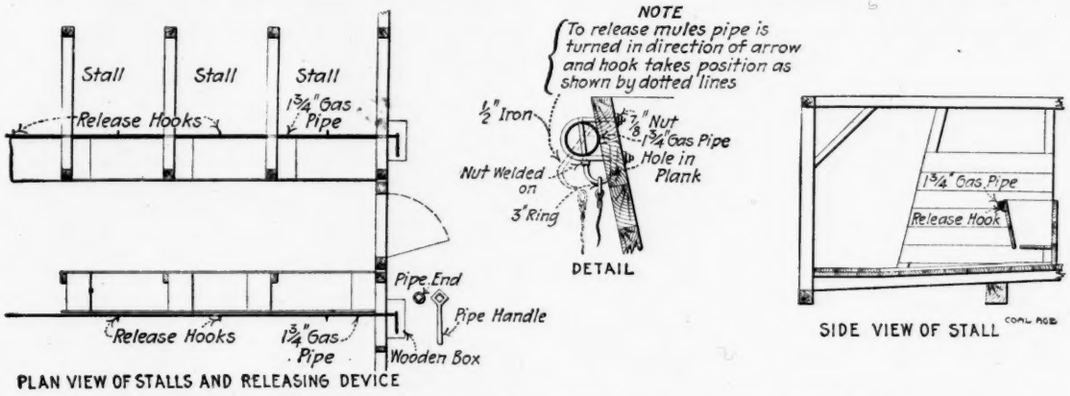
The railroad company is said to demand the higher rate from Ohio operators because it has to assemble the cars for the Ohio shippers, while this is not necessary for the coal that is delivered to it from the Kanawha & Michigan at Armitage. The full train already "made up" is turned over to the Hocking Valley, and all the latter has to do is to haul it to the Toledo docks.

Hocking Valley coal operators say they can compete successfully with the West Virginia operators if a reduction in the Nelsonville rate to 67c. per ton is fixed. At this rate, it is alleged the railroad company would be making an extra profit of 17c. per ton off the Ohio operators, as the utilities commission has fixed a rate of 10c. a ton for assembling or "making up" a train of coal cars.

Emergency Unhitching Device

The *Employee's Magazine* of the Lehigh Valley Coal Co. describes a device which released all the 43 mules from their stalls by a single turn of a handle in the old barn of the Centralia colliery early Sunday morning, Sept. 21, when the building caught fire. A mere turn of a handle at either end of the barn releases simultaneously all the chains attached to the animals, and thus enables them to be driven from their stalls with the least possible delay.

The accompanying sketch shows the arrangement and operation of this device. It consists of a long wrought-iron gas-pipe 1¾ in. in diameter, extending from end to end of the building, and passing through all the stalls. The pipe is held firmly in place against the front of the mangers by ⅞-in. iron rods, secured with ⅞-in. nuts and washers. In each stall and passing through the middle of the pipe is a ⅞-in. iron rod fastened with a lug and welded nut and bent like a hook, with its point resting in a slight depression in the plank. On this hook is placed a 3-in. ring that holds the clip or cross piece fixed on the end of the halter chain attached to the animal.



A Device for Unhitching All the Mules in a Row of Stalls at One Operation

It is a simple matter to remove the clip or cross-piece from the ring when only one animal at a time is to be released. In case of emergency, however, when it is extremely urgent to unhitch or release all the animals at once in order to remove them as quickly as possible from the stable, the end of the pipe is given about a quarter of a turn, and all the hooks turning with the pipe will move back, thereby permitting the rings to slip off and thus release all the animals at the same time.

At least 100 cubic feet of air per minute should be allowed for each man in the mine and 500 feet per minute for each animal. In the anthracite district of Pennsylvania 200 cubic feet per minute is required. If the mine makes inflammable gas, there should always be allowed at least 150 cu.ft. of air per minute for each person. There should be a separate split of air for every 50 to 100 men, depending on the laws in force in the state where the mine is located. By this provision, air is supplied without excessive velocity and the products of an explosion in one section may not invade another.

Who's Who--In Coal Mining

Every movement centers around some personality, for there is no such thing as impersonal development in human affairs. Every new mental attitude, humanitarian, intellectual, financial or what not, clothes itself in a man for without such a visible presentation, the movement seems too abstract for acceptance. There are a few people who declare themselves for principles and decry persons, but in the end the principles of the persons are more important and more forceful than either.

The American Mine Safety Association has come to the point where it needs and must have a leader. Hitherto, it has been ably fostered by the Bureau of Mines, in the person of H. M. Wilson, but whether it does or does not do in the future what is expected of it, depends on whether it finds, somewhere, a man around whom its activities can in the future be developed.

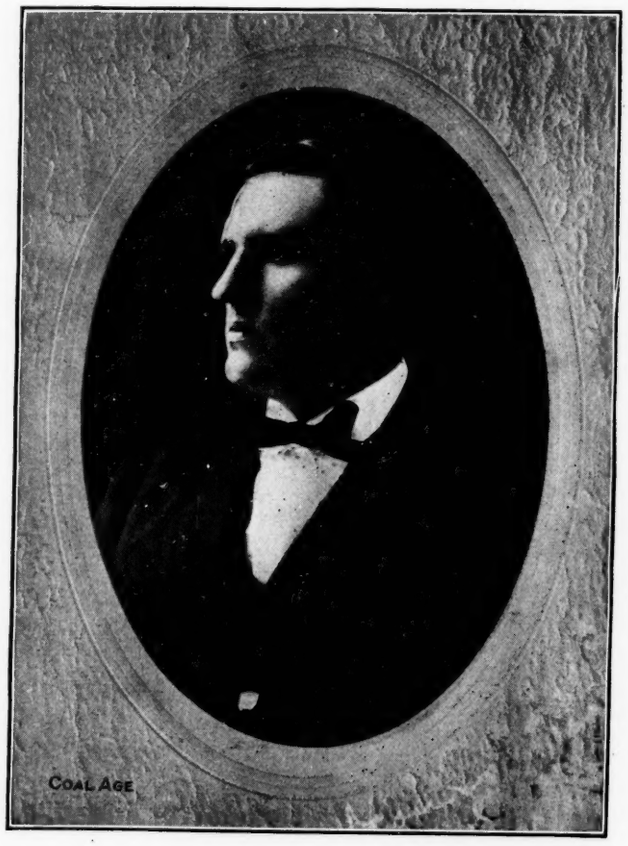
And that man it trusts it has found in John P. Reese of Gillespie, Ill., its second president. It will be difficult to make this movement a success, for the heterogeny of elements entering into membership makes its progress difficult. The medical men who must debate the subject of first-aid methods, the rescue experts who must decide on the right manner of mine recovery, the managers and superintendents who must discuss accident prevention, and the miners whose interest must be stimulated by contests, together combine to make the problem of the chair, most varied and difficult. But if the work be accomplished at all it will be by reason of its appeal to every element in the industry.

Mr. Reese is not a professional philanthropist full of statistics and sighs whose business is to lament that other people do not live as justly as he would if placed under like conditions. In fact, he does not lay claim to any such superiority and would be slow to acknowledge, doubtless, what is undoubtedly true and that is that he has, as a result of his experience, a broader comprehension than others of the needs of men less fortunately circumstanced than himself. Large of frame, cheerful in mind, buoyant in spirits, he impresses you as a philosopher despite himself, and the work he will do will be as virile in character as suits a man thus constituted.

In fact, the work to be performed is hardly sentimental for the liability laws have transformed safety prevention in most states from a philanthropy into an economy, and have put life conservation on a plain "bread-and-butter" basis. The operator is not only admonished to see that he does not offend but also compelled to make sure that the employee himself does not break the rules of safety, for in either case he must pay and usually heavily.

John P. Reese was born of Welsh parents, at Sodom, Trumble County, Ohio, Jan. 14, 1877. His father, who was a coal miner in his native land, came to Ohio from Wales in 1872. The family moved to Shawnee in the same state when John was two years old. His father died in 1883, leaving a large family of small children with no visible means of support; but the mother, a hard-working, honest, Christian woman, succeeded in giving them good training, though much schooling was out of the question.

John started to work at the mines in Shawnee, Ohio, when he was 9½ years old, and with the exception of 2½ years (between 16½ and 19 years of age) when he worked as a brakeman, he has remained in the industry ever since. Despite 10 hr. of mine service every day, he attended night school for several winters. At the age of 13 yr. he was the sole support of his widowed mother and three younger children, and so continued till he reached 21 yr. of age when he married a school teacher at Hiteman by the name of Blanche Ghrist.



JOHN P. REESE

He was then employed as checkweighman and held at different times the office of local president and state vice-president of the United Mine Workers of America. He does not hesitate to credit his wife and mother with whatever success he has had in life. His sympathies have always been with the "union," to which he has belonged from a boy. He joined the Brotherhood of Railroad Trainmen when engaged as a brakeman and kept up his dues till the Iowa miners were organized into the U. M. W. of A. in 1898 with his active assistance.

Since that time he has been vice-president and president of the Iowa district and a member of the National

Executive Board of the U. M. W. of A. He resigned his Iowa presidency in 1902 and ran for congressman on the Democratic ticket in the sixth Iowa district and was naturally defeated in that stronghold of Republicanism.

So renouncing his congressional ambitions, he served for several years as commissioner and secretary for the Iowa Coal Operators Association resigning in 1908 to become assistant superintendent of the Consolidation Coal Co., at Buxton, Iowa. In 1909, he became president and general manager of the Ogden Coal Co., at Ogden, Iowa, and in January, 1910, he returned to the Iowa Coal Operators' Association as president and chief commissioner, but he resigned on Oct. 1 of the same year to accept his present position as general superintendent of the Superior Coal Co., of Gillespie, Ill.

On Sept. 1, 1912, his jurisdiction was extended over the Consolidation Coal Co.'s mines at Buxton, Iowa, and his title is now general superintendent of the coal properties of the Chicago & Northwestern Ry. Co. Their mines are the largest producers in Illinois and Iowa.

Mr. Reese has been elected president of the Mining Institute of Illinois. He has, of course, several business connections being vice-president of the Coyne-Reese Drill Co., of Des Moines, Iowa, director of the Home Savings Bank of that city, and of the Ogden Coal Co. Happiest when in company, he belongs to several fraternal organizations and clubs, but his greatest delight is in his Gillespie home with his daughter of 14 years and his son of 12.

If the American Mine Safety Association is to find a man who has a broader sympathy with all concerned in the mine-safety movement, it will have to look far afield. A good talker and *raconteur*, a cheerful whole-souled fellow, a man with knowledge of both pick and pay roll, he should be able to arouse the necessary interest and enthusiasm and put the association on a firm working basis.

Concussion as a Cause of Explosions

SYNOPSIS—Inflammations of coal dust and air are propagated by burning gas but in explosions the coal is burned as a whole and not merely distilled. A big blower of gas will not raise a dust cloud but projected into such a cloud 150 ft. long, it will propagate with low pressures and will probably under favoring conditions develop a most violent explosion.

In the combustion of gaseous mixtures, there is no well defined border line between inflammation and explosion, the two terms being employed merely to indicate differences in the rapidity of combustion. But in the burning of mixtures of coal dust and air, it appears possible, and indeed necessary, to draw a line of distinction between inflammation and explosive combustion.

The "explosion-wave" in gases—the most rapid form of combustion—is, however, of a different character from ordinary combustion. The rate of travel of the explosion-wave is a definite physical constant for any particular mixture of gases in which it can be set up. Fortunately, it does not appear possible to produce the explosion-wave in mixtures of firedamp and air, or of coal dust and air.

Inflammation and Explosion of Coal Dust Defined

Put briefly, our view is that during an inflammation of coal dust (at all events from bituminous coals) the flame is propagated largely by the burning of gases distilled from the dust; whereas during explosive combustion the portion of each dust particle which aids in propagating the flame is burned as a whole, both the volatile matter and the fixed carbon being consumed.

Fundamentally there appears to be no reason why the inflammation of mixtures of combustible dust and air should not produce results of the same nature as those observed during the inflammation of gaseous mixtures, for in both cases the phenomena are the results of rapid combustion.

The more finely divided the combustible dust, the more nearly does it approach to the condition of a gas or vapor, and, if of sufficient lightness to remain in suspension in the air and thus form an intimate mixture with it, there seems to be no reason why a flame once started in such a mixture should not be propagated throughout its extent—it being presumed that the dust can be inflamed readily.

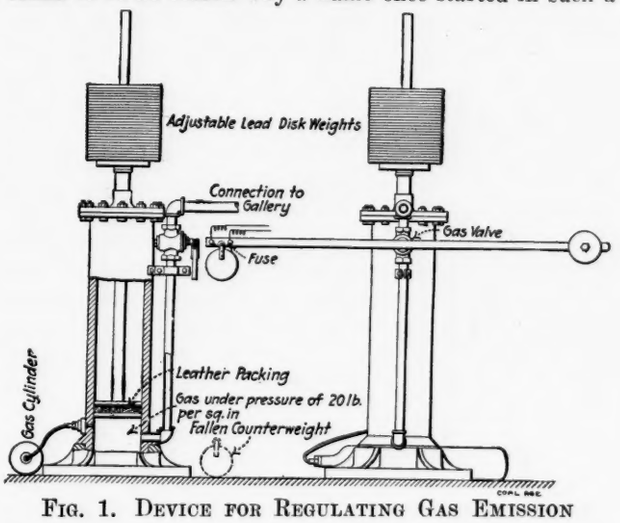


Fig. 1. Device for Regulating Gas Emission

Difference between Gas and Inflammable Dust

In making comparison, however, between the combustion of a gas, such as methane, and that of particles of coal dust, the great difference in size of gaseous molecules compared with that of dust particles must be borne in mind.

If it be assumed, for example, that a coal-dust particle has a diameter of $\frac{1}{1000}$ mm., about $\frac{1}{25000}$ of an inch, this is over 3000 times the computed diameter of a molecule of oxygen. Moreover, gas molecules are always in

Note—An abstract from the fourth report of the British Explosions in Mines Committee, signed by Sir Henry Cunyghame, R. A. S. Redmayne, A. P. H. Desborough, H. B. Dixon, and W. C. Blackett.

very rapid motion, the mean speed of oxygen molecules at ordinary temperature and pressure being about 425 m. or about 1394 ft. per sec. Compared with this speed, that of the floating dust particle is inappreciable. Such a dust mote floating among oxygen molecules might, perhaps, be compared to a balloon lashed by a storm of hailstones.

Similarities in Explosive Characteristics of Gas and Coal Dust

Despite the difference in size of the reacting bodies, however, there are several analogies which may be drawn between explosions of gaseous mixtures and of mixtures of a combustible dust and air.

As in the case of gaseous mixtures, there will be a definite ignition temperature for each kind of dust and air mixture, and inflammation will not be propagated unless and until each successive "layer" of the mixture has been raised to that ignition temperature.

Similarly, there will be a "lower limit" as regards the quantity of any given dust which must be in suspension in the air to enable self-propagation of flame to take place.

How an Inflammation Is Propagated

When considering the question of the *propagation* of the initial inflammation of coal dust the nature of the means of ignition must not be overlooked.

If a previously formed dust cloud in the air be presumed, it can be taken for granted, on *a priori* grounds, that, once ignition of a sufficient volume of the cloud has been effected, no matter by what means, propagation of the flame will take place throughout the cloud if the fineness of the dust, the quantity of dust in suspension, and its ignition temperature are suitable.

In a mine explosion, however, a dust cloud does not necessarily exist ready formed; but the cause of inflammation has, in most cases, to produce the dust cloud simultaneously by disturbance of the air. In such cases, therefore, where the dust is not already in suspension, both flame and *concussion* are necessary for the initiation of more than a purely local inflammation.

For the propagation of flame in a mine, therefore, it appears to be essential that (1) a ready formed dense cloud should be present for a considerable distance along the roadway; or that (2) the source of heat which causes ignition should also create a disturbance of the air and thus raise in suspension deposited dust.

The Effect of Eddies on an Explosion

When the inflammation occurs and the flame proceeds along a gallery, the expansion of the gaseous products of combustion causes a movement of a column of air which is pushed forward in front of the flame. The opposition to this movement may be approximately calculated for a smooth gallery, since it depends on the inertia of the air to be moved, or the velocity of the air pushed forward, and on the size of the tube.

But in the roadway of a mine this opposition may be enormously increased by the irregularities and obstructions which cause waves and eddies in the air. A cloud of dust so compressed and disturbed burns with greater rapidity than in still air. The effect on the intensity of the advancing flame is thus cumulative. It may therefore be true that after the flame has proceeded a certain distance in the ready formed dust cloud, the column of air driven in front of the flame is capable of raising the dust lying on the floor and other surfaces, and so creating an inflammable cloud, independently of any other source of disturbance.

The Pioneering Dust Cloud

This conception of the manner in which an inflammation of coal dust and air is capable of increasing in intensity and of propagating itself throughout any length of roadway containing at the outset dust, merely deposited and not suspended is due, we believe, to W. C.

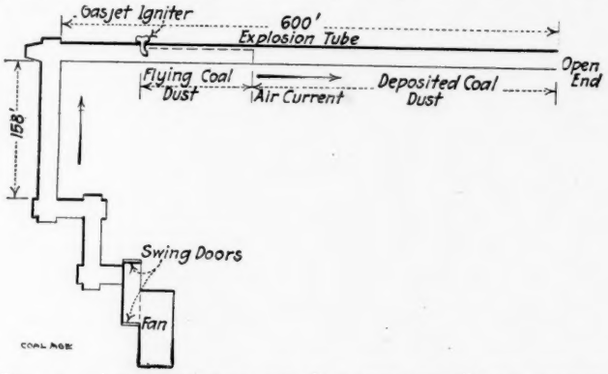


Fig. 2. Arrangement of Gallery to Show under What Conditions an Explosion Can Be Started by Flame in a Dusty Atmosphere

Blackett, who, from a study of the conditions existing in the Seaham, Tudhoe, Trimdon Grange and Usworth collieries, after the disastrous explosions which occurred there formulated his theory of a "pioneering cloud."*

This theory was founded, as aforesaid, on practical experience obtained during the course of investigations made *after* colliery "explosions." It remained to be seen how far it was borne out by what takes place *during* experimental inflammations on a large scale.

Explosions without Initial Concussion

A number of experiments for the purpose of obtaining information on this question were made by Doctor Wheeler for the Mining Association in the Altofts gallery. The results, which are given below, have not hitherto been published.

Arrangements were made by which dust clouds of different extent could be ignited by a large gas flame, unaccompanied by any concussion. The general arrangement for these experiments is shown in Fig. 2. The gallery (the Altofts gallery) consisted of a wrought-iron tube 7½ ft. in diameter and 600 ft. long. One end was open to the air and the other was joined, by means of a series of right-angle bends, to a fan. For a more detailed description of this gallery the "Record" of the Mining Association should be consulted.

The igniting arrangement is shown in Fig. 1. It consisted of a vertical cylinder, of about 2 cu.ft. capacity, fitted with a weighted piston. This cylinder was filled with coal gas under a pressure of 20 lb. per square inch, the pressure being obtained by weighting the piston with lead disks placed on a platform carried by the piston rod.

An outlet tube from the bottom of the cylinder was bent upward at right angles and closed at the top by an

*Vide "The Combustion of Oxygen and Coal Dust in Mines," Transactions Federated Mining Engineers, Vol. 7, p. 54, 1894. See also Proceedings of the National Association of Colliery Managers, March, 1891.

electrically controlled valve. Beyond the valve, the outlet tube was continued through the side of the gallery (as indicated in Fig. 2), and ended in a 2-in. nozzle fixed centrally in the gallery and directed toward its open end.

A Blower of Gas Fails to Cause Explosion

Just before an experiment, sparks from an induction coil were passed across the nozzle of the tube inside the gallery. When the valve on the cylinder was released, the weighted piston fell and forced out the coal gas which was then ignited by the induction-coil sparks at the nozzle. A large jet of flame was thus produced, from 10 to 14 ft. long and about 1 ft. in diameter at its widest part, resembling an ignited "blower" of firedamp. No unburnt gas escaped into the gallery.

After numerous trials it was found that with a 2-in. nozzle, and with the gas under a pressure in the cylinder of 20 lb. per sq.in., immediate ignition by the induction-coil sparks was obtained when the valve was released. A smaller nozzle gave a longer flame but ignition of the gas was uncertain.

Adding Coal Dust to Blower

A large flame of this nature (unaccompanied by concussion) was found capable of igniting a ready formed cloud of coal dust, but was unable to propagate flame for any considerable distance when the coal dust was simply placed in a heap in its path. It was, therefore, necessary to create beforehand a dust cloud over a certain distance, into which the flame from the igniter could be projected.

This was done by spreading the dust on thin horizontal boards, 6 in. wide and 12 ft. long, suspended from the roof of the gallery and extending end to end over a distance of 150 ft. from the igniter toward the open end of the gallery. These boards, which hung about 8 in. below the roof, were caused to fall simultaneously, at the same instant as the gas flame was produced, by the release of electrically controlled catches; and, after falling 6 in., still in a horizontal position, were suddenly jerked over sideways, so that the dust resting on them was projected into the air. In this manner a ready formed dust cloud was produced extending 150 ft.

The Dust and Gas Raise a Pioneering Cloud

Beyond this 150 ft. of previously formed cloud, the coal dust was simply deposited on the floor of the gallery over the distance remaining to its open end, namely, 350 ft. The coal dust, which was obtained by pulverizing Altofts silkstone nut coal, was present throughout in quantity corresponding to 0.4 oz. per cubic foot of air space.

A current of air, of insufficient velocity to disturb the dust deposited on the boards, was forced toward the open end of the gallery during each experiment.

Three tests were made in this manner. In one of them the flame traveled only 200 ft. from the point of ignition; that is to say, only 50 ft. beyond the distance over which the ready formed dust cloud extended. In the other two experiments the flame traveled the whole length of the gallery, and issued 115 ft. out of the open end into the air, the average velocity over successive distances of 100 ft. slightly increasing.

The Absence of Preliminary Concussion Makes Explosion Feeble

It is thus apparent that if an inflammation which is initiated without concussion takes place in a gallery along which for a certain distance a ready formed dust cloud extends, sufficient force is developed at the end of this cloud to raise in suspension deposited dust, in advance of the flame, so that the propagation of inflammation is continued.

Very little pressure, less than 2 lb. per square inch, was produced by the inflammation in any of the three experiments; and there was a temporary slackening in the rate of progress of the flame along the gallery where it came to the end of the ready formed dust cloud. Perhaps 150 ft. is about the minimum length, with the quantity of dust employed, of a ready formed dust cloud which will insure self-propagation of flame; just sufficient force being then developed, or rather, a just sufficiently *rapid* disturbance of the air being then produced, to raise dormant dust in advance of the flame. Three experiments in which the ready formed dust cloud was in existence over only 100 ft. from the point of ignition all failed to propagate flame beyond that 100 ft.

However, Concussion Is Not Needed to Produce an Explosion

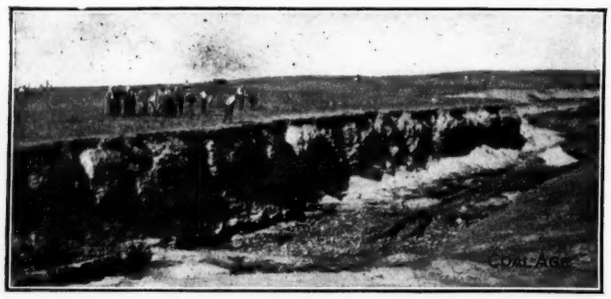
These results appear to establish the fact that for a propagating inflammation to take place in a mine, the concussion of a blown-out or overcharged shot, or of a firedamp explosion, is not essential. Given a ready formed dust cloud of a certain extent, a flame, without any concussion, can ignite the dust and the resulting inflammation will spread through the cloud, the rapidity of combustion increasing as it travels. Ultimately, if the conditions remain favorable to the "pioneering phenomena," the "inflammation" will give place to "explosive combustion" in the manner explained in the ensuing section of this report. These conclusions are supported by further experiments now in progress, the results of which will shortly be reported.

Powder in Open-Cut Mining

Open-cut mining in the Pittsburg coal field of southeastern Kansas was first done by scrapers and horses. Three years and a half ago Miller and Durkee introduced a steam shovel for the purpose. It has proved a success, but in the last few weeks the shovel operators have learned to use blasting powder to help the shovels.

C. H. Markham is the only steam shoveler using powder up to the present date in stripping. Others have held back because of the inconvenience of boring the holes for the powder. These must usually be 18 to 30 ft. deep, and a drill for this purpose is bunglesome and difficult to handle. However, Markham is perfecting a drilling apparatus that will probably make the sinking of holes a one-man job.

Markham has found the use of blasting powder valuable in expediting the work of the steam shovel and for saving the hardest wear and tear on the ponderous machinery. This means that the cost of production is reduced. He is one of those who are making money. The overburden in the stripping field contains a couple of feet or so of hard shale. Many miners affirm having seen blue smoke from the friction of shovel-dipper and shale. The big machines rock terrifically in cutting through this material. The steel beams of their underwork have been known to crystallize from the vibrations and break, which naturally adds materially to the operating cost.

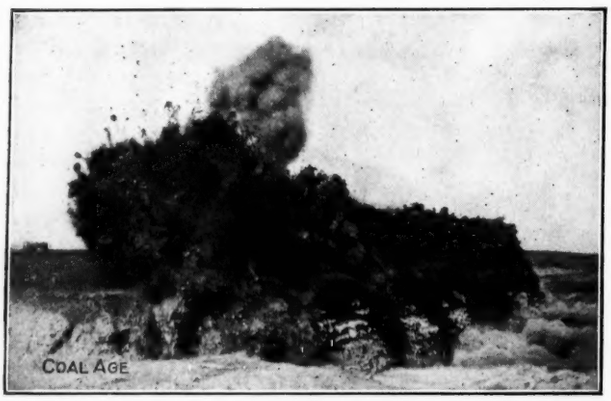


LOADING THE HOLES WITH 2500 LB. OF POWDER

Markham's blasting has been similar to that done extensively by Edward Evans, of Cherokee County, Kan., and by J. J. Lavery, near Liberal, Mo., not far from Pittsburg. The latter recently made a blast with 2500 lb. of powder at a single time.

ONE HUNDRED KEGS OF POWDER USED IN ONE PIT

He had a pit 18 ft. deep which he had been working with horses and scrapers. It was 500 ft. long, or in other words, the face was of that measurement. Fifteen feet



THE SHOT

back from the face he sank 18 holes, which were 24 ft. apart and 15 ft. deep. These were sprung, first with two sticks, then four sticks and at last with six sticks of dynamite, making 12 sticks in all. This work required about two or three hours. Exactly 100 kegs of Hercules 4F blasting powder were used, and Charles B. Spicer, Pittsburg, agent for this explosive, used an electric firing apparatus with which to discharge the shot. Workmen began springing the holes when Spicer reached the pit at 9 o'clock in the morning, and he left the work completed, at 3 p.m. He said that were he directing another shot of this kind he would recommend that the holes be 20 ft. apart only, when circumstances are as above described.

THE RESULT OF THE BLAST

The shot made a pit 30 ft. wide, or a little more, as the blast broke the shale covering a little more than 15 ft. on the inner side of the face. A fair percentage of the dirt was thrown far enough to one side to make it unnecessary to move it further. Mr. Lavery says: "The cost of getting coal out of a strip pit with teams and scrapers probably isn't as cheap as with steam shovels, but the blasting as I did it will save a lot of labor and reduce the cost of production."

If this is true with teams and scrapers it is argued that it must be true with steam shovels, as such machines could probably work twice as fast with the overlay loosened up. Besides, the cost of maintenance of a better treated shovel would not be so high.

The Lavery pit works from 20 to 40 teams, with wages for man and horses at $3 a day and up, depending on the work done. Expenses per day are $100 up. The cost of the shot was $118.

The Sacrifice!

BY BERTON BRALEY

Written expressly for Coal Age

Here are two men dead in a barroom brawl,
Two men who shouldn't have died at all,
Two husky miners we shouldn't lose,
Who lie here, lifeless, because of booze.
And their kids can cry and their wives can wail;
Yet here they huddle, two good, strong men,
And never a sound or a friendly hail
Can bring these miners to life again!

They were bosom pals when they came tonight,
Who drank together in all good will,
Till the whiskey put their brains to flight
And roused them to quarrel and row and fight
And drove them, at last, to kill!

So the knives came out as the drink poured in,
Burning each man with the fires of sin,
Searing them deep with wrath and hate
And all the passions fresh-come from Hell,
Till the knives flashed free and the blades struck straight
And one man stumbled—the other fell
In a pool of blood on the barroom floor
And neither one stirred when the fight was o'er.

Now it wasn't hate or a bloody feud
But a deadly madness the whiskey brewed,
And we've lost two men in a drunken strife,
Two brave, strong men in the prime of life,
Each with his children and home and wife!
They never will drill a hole again,
They never will joke with the other men,
They never will come through the deepening gloam
To greet their kiddies and wives at home!

They're dead and done for because of **drink**
—But still we hark to the glasses' clink,
As the barkeep says, with a smile so **free**
"Speak up now, gentlemen, what'll it be?"

Editorials

The Legality of Unions

The United States Circuit Court of Appeals has affirmed the judgment of the Connecticut District Court in the famous Danbury hatters case, but those who hope that unions will be declared illegal will gain but little comfort from the decision. It appears that the commodity, labor, can be made the subject of trust regulation without anyone being responsible before the law. This decision would not trouble us much, if we did not think that this viewpoint arose in the courts from fear of the danger which would accompany a contrary decision, and from the fact that in most, if not every county, the lawyers have a union of their own which somewhat effectually sets a minimum price for legal services.

Judge Coxe states in the decision to which we have referred that: "No one disputes the proposition that labor unions are lawful. All must admit that they are not only lawful, but highly beneficial when legally and fairly conducted, but like other combinations, irrespective of their objects and purposes, they must obey the law."

We conceive, therefore, that working men may combine to raise wages, improve working conditions, or to restrict hours of work, and so forth, and can, in this way, legally influence the price of products on the market. We conclude, therefore, that the objection of the judge is to such boycotting as that of which the United Hatters of North America have been guilty.

The declaration of the judge that "no one disputes the proposition that labor unions are lawful," is amazing. It has been quite generally disputed, and we have always been surprised that judges will permit the rules of lawyers, doctors and others to be produced in court as evidence that certain charges to clients are reasonable. For such rules are like union scales in restraint of the freedom of trade.

But those operators who are in union states are to be congratulated that the judges seem to take the view that labor is not a commodity of commerce coming under the Sherman act. Such operators are engaged in a criminal conspiracy to regulate the price of labor if the miners are engaged in a like conspiracy. If the law is once declared and affirmed to apply to labor unions in their regulation of the price of labor, it may be applied to organizations of operators for the same purpose. As the members of the latter have money, they can be made to pay damages. The miners having little or none cannot. So it is like a game of poker, where one man has money and another has not. The poor man cannot lose and the rich man may.

There is some cheer in the following words of Judge Coxe:

> That the anti-trust act is applicable to such combinations (unions) is no longer debatable. The law makes no distinction between the classes, employers or employees, corporations or individuals. Rich and poor alike are included under its terms. The Supreme Court particularly points out that, although Congress was frequently importuned to exempt farmers' organizations and labor unions from its provisions, these efforts all failed and the act still remains.

We have yet to determine, of course, by several cases in the courts just what labor unions may and may not do. But it seems clear that as far as that United States Circuit Court of Appeals is concerned, the workingmen may legally form unions to raise wages.

The Report of the Secretary of the Interior

It is sometimes unfortunate to be only a citizen and not in the official class. We have to take such information as is vouchsafed us and endeavor to make it meet our ends.

Some time ago, the Director of the Geological Survey and his able lieutenant on the Land Classification Board, wrote us complaining of a statement we had made. We made a retraction but we were not able then to determine definitely whether we accepted in lieu of ours, the figures submitted. So very frankly, we admitted that we could not say whether we accepted them or not.

When recently we met a representative of the Geological Survey, he declared this noncommital statement, a shameless innuendo, and advised us to apply to the Survey for more figures whereby we might frame a retraction or an indictment. We have written to the Survey and we are still in the dark.

Let us, therefore, lay down in black and white our manner of reasoning and leave to our readers to judge whether we truly lined out the fact in writing the innuendo to which reference was made.

As a preliminary, to make the facts clear to the general reader, we quote George H. Ashley, in his bulletin on the "Valuation of Coal Lands," who says:

> Prior to July, 1906, it was the practice to dispose of coal lands at the minimum prices fixed by the law, viz.: $20 per acre for lands within 15 miles of a completed railroad and $10 per acre beyond the 15-mile limit. Since that date, lands which have been classified and valued have been disposed of at fixed prices based upon the value of the coal in the land.

On the strength of this change, George Otis Smith ventures, on p. 332, of his report for 1912, to give the following table:

SALES OF COAL LANDS AT ALL PRICES IN THE UNITED STATES EXCLUSIVE OF ALASKA FROM 1903 TO 1911

Fiscal Year	Entries	Acres	Receipts	Average Price per Acre
1903–4	190	28,827.42	$395,209.90	$13.74
1904–5	158	20,456.35	277,402.40	13.56
1905–6	244	42,143.39	538,683.70	12.54
1906–7	157	20,387.02	303,255.60	14.80
	749	111,814.18	$1514,551.60	$13.54
Fiscal Year	**Entries**	**Acres**	**Receipts**	**Average Price per Acre**
1907–8	299	58,047.10	$647,584.55	$11.15
1908–9	182	26,590.68	502,743.65	18.90
1909–10	189	26,074.16	657,175.80	25.20
1910–11	83	15,284.89	251,323.03	16.44
1911–12	76	7,951.05	402,521 78	50.62
	829	133,947.88	$2461,348.81	$18.30

Now, these facts seem cunningly arranged to mislead, for though they are intended like those in Mr. Smith's letter to us, published Nov. 22, 1913, to prove that classified lands have been selling, it appears to include all

lands, some of which were not sold at classification prices at all, because they had not been withdrawn from classification before sale or had been filed on, before withdrawal. To show that such lands exist, we quote the report of the Commissioner of the General Land Office for the fiscal year ended June 30, 1907:

> In the case of coal lands withdrawn for classification and valuation, persons who had prior to withdrawal initiated valid possessory claims are permitted to perfect same, notwithstanding the withdrawal.

It is interesting to note the fact that the entries in 1907-1908 were 299, the acreage 58,047 acres, and the average price a trifle over $11 per acre, while in 1911-12 the entries were only 76 in number, the acreage only 7951 acres and the average price had risen to over $50. Do not all these facts tend to show that in the first of these years, several plots were sold at the minimum under the law of 1873?

It is interesting to note in the report of the Geological Survey for the fiscal year ended June 30, 1912, out of 829, no less than 628 entries were for $10 or $20, the exact amounts named in the act of March 3, 1873, leaving only 201 entries sold at other prices, mostly higher than $20 but nineteen lower than that figure. Of course, the Geological Survey has chosen the two prices, $10 and $20, for some inferior lands, but doubtless most were not sold at the Survey's prices at all.

A well posted Westerner writes us:

> I confirm your conclusions that the sales in 1907-08 were largely on unclassified lands and where the lands had been filed upon, prior to withdrawal and valuation. These lands were sold, of course, at the minimum prices, although the Government, in some cases, contested these filings, asserting that the parties were not actually in possession. There is no doubt in the world that locators took advantage of their knowledge of the Government's intention to revalue and classify coal lands and therefore in 1906, on some unsurveyed land, upon which there were squatters under the law of 1873, giving a man the first right to purchase by paying the minimum price, this right was exercised by many people and filings made in the latter part of 1906 were paid for in 1907 at the minimum prices which, no doubt, swelled the acreage.

Mr. Ashley himself in a letter of Dec. 26, 1913, says:

> Of course, it is obvious that all prices except $10 and $20 are those fixed by the Geological Survey. Since the greater part of the coal lands classified within the past six years have been valued at the minimum of $10 and $20 it is probable that a large proportion of the tracts listed as sold at those prices are of such character as have been or would have been if classified, when sold, appraised at those prices.

This opinion we cannot indorse and we only quote the statement to evidence that coal lands have passed at unclassified figures.

As a further reason for our belief, that coal is not selling freely, we quote from the report of the Secretary of the Interior to the President, Dec. 10, 1913:

> Our coal land is not being used under this plan (the classification of land and its vending at the price appraised) save under exceptional conditions of local and immediate demands and the purchaser, where there is one, is speculating on the best guess that an honest geologist can make as to the amount of coal in the ground.

So far we have said nothing about the fact that the prices for coal land were, when first appraised, more reasonable than they now are. Despite the fact that the government withdrew first, those plots which were most valuable, the appraisements given in the report of the Commissioner of the General Land Office for the fiscal year ending June 30, 1907, show the following figures: Noncoal, 1,269,720 acres; land to be sold at legal minimum, 24,950,120 acres; $20 per acre, 94,400; $25 per acre, 212,200; $30 per acre, 8000; $40 per acre, 2720, and $50 per acre, 85,880. These prices, it will be seen, are well below $510 per acre, which is now the maximum.

It is true higher prices were then in contemplation for the Commissioner says in the same report, "A considerable amount is being scheduled as coal lands of great value ranging as high as $75 per acre." Confiding commissioner, how could he gage the avarice of the land-holding class, be it bond holder or bureaucracy!

There is another line of misrepresentation which consists in urging that sales are as satisfactory now as they were before prices of coal land were raised. The Survey urges that increases in price have not retarded sales. We have seen how evident it appears that the figures showing sales at higher prices are not really representative of true conditions. They probably include all three types of abnormal transfers: Sales not made at present ratings, sales made at lower prices than now rule and sales of coal land made for their value as town sites.

But even if we assume that the sales since June 30, 1907, show all that is alleged, we cannot see that the Geological Survey proves its case. Let us quote other enlightening utterances of the Commissioner of the Land Office, for he, like the Secretary of the Interior, inconsiderately at times lets the whole truth become manifest. He says in his report for the fiscal year ending June 30, 1907:

> The futility of the Land Act of Mar. 3, 1873, is shown in the fact that since its enactment less than 500,000 acres of coal lands have been patented under it, while millions of acres of coal lands have been taken under other forms of entry, some of it unwittingly, but large areas in order to avoid the terms of the coal-land act, coal lands being the highest priced lands offered by this government.

So there *was* a marked tendency to obtain coal lands before 1907, but people believed that the evasion of the law provided a better way and the sales were not made of such lands under their proper title, but as if their real value was for farming purposes. It is true this was a mistake; the Land Office has been rounding up offenders and making them pay the larger prices. But we are not concerned with the error in judgment, but with its effect on sales, and as the Commissioner shows, it restricted these most measurably. Perhaps in many cases this also accounts for recent sales, for when developments have been made it is better to pay well for the land than to throw improvements away.

All in all, the report made year after year to the President is misleading in the extreme. The public have been deluded. The high cost of living is being raised in the West by the restriction of competition in that section. It is generally acknowledged that prices of coal at the mine in the public-land states are higher than in the East. Let us quote the Commissioner of the General Land Office in his report of June 30, 1910:

> The progress of advancement in the West is being retarded under present conditions by the difficulty in the successful operation of new mines under legislation as it exists today. Competition has been checked. The consumer is having to pay therefore, a greater price than it would be reasonable to expect he would have to pay if it were possible to open mines under legislation which would encourage the development of mines.

Therefore, it is with hope that we hail F. K. Lane's report, and the statement of G. O. Smith before the American Mining Congress. It is none too soon that a new system should be inaugurated. We are thoroughly in accord with the Geological Survey in believing that the royalty system is by far to be preferred to one based on outright sale.

Legal Department

When Is a Coalyard a Nuisance?

By A. L. H. Street*

SYNOPSIS—Location or manner of operation will not be interfered with unless it constitutes an unreasonable interference with residential rights.—Nature of neighborhood a controlling circumstance.—Amount of investment no defense.—What American and Canadian courts have held.

A coal yard, being a part of a lawful business, is held by the courts to become an abatable nuisance only when it is so located or so conducted as to become obnoxious to the general run of citizens.

The Alabama Supreme Court has sustained the right of an owner of property in a residence district to maintain a suit to enjoin the maintenance of a yard and coal bins so near his dwelling-house as to render habitation thereof undesirable, unpleasant and burdensome, on account of the emission into the air of coal dust. (Johnson vs. First Avenue Coal & Lumber Co., 54 Southern Reporter 598.)

It is true, however, that the complaint in this case was coupled with a protest against the operation of a planing mill in connection with the coal business, which increased plaintiff's discomfort, because of the noise and vibration produced by the mill. But the decision of the court recognizes the emission of coal dust as constituting a nuisance independently of the planing mill. The court sustained the right of the legislature to define abatable nuisances, in the proper exercise of the state's police power to protect the public health and safety; but, on the other hand, upholds the right of owners of coal yards to be protected in the enjoyment of their property, under the guaranty of the Federal constitution that no person shall be deprived of his liberty or property, unreasonably, arbitrarily or without due process of law. This constitutional right, the court says, "cannot be destroyed under the guise of police regulations. The legislature cannot, therefore, by its mere *ipse dixit,* make that a nuisance which is not in fact a nuisance or akin thereto."

The principle that a private citizen cannot maintain a suit in his own name, as distinguished from an action brought by public authorities, to enjoin continuance of a claimed nuisance, unless he suffers loss or inconvenience different in kind and degree from that suffered by the public at large, was applied in this case. The court holds that an individual must show the existence of a continuing nuisance or a real danger of serious and irreparable damage. "In determining whether an alleged nuisance should be abated, everything should be looked at from a reasonable point of view. The law does not regard trifles or very small inconveniences, but only those that are sensibly so—those which diminish the comfort or enjoyment of the complainants, or those sought to be relieved, or which sensibly diminish the value of property sought to be relieved, from the effects of such alleged nuisance.

*Attorney-at-law, St. Paul, Minn.

An Individual Must Expect to Suffer Some Annoyance

If one lives in a town, of necessity he must suffer some annoyance from the carrying on of the various trades which are properly located and carried on in his immediate vicinity, and which are necessary for the public trade and convenience, and for the public at large." And, according to the same decision, if a person takes up his residence in a business district, he must abide the natural inconvenience attendant upon residence in such a neighborhood. But if a business enterprise invades a residence district, a dwellinghouse owner will be entitled to enjoin conduct of the business in such manner as impairs the enjoyment of his home and the value of his property.

But, as decided by the Illinois Supreme Court in the case of Wente vs. Commonwealth Fuel Co., 83 Northeastern Reporter 1049, the standard of discomfort in the enjoyment of a home is not established by the sentiments of "persons of delicate sensibilities and fastidious habits, but by the habits and feelings of ordinary people."

In the last cited case, which was a suit to restrain defendant from piling coal against the wall of plaintiff's building and from operating a coal hopper in such a manner as to cause smoke, dust and cinders to permeate the air in the building, the Illinois court decided that the fuel company could not assert as a defense to the suit the fact that the hopper had been created at great expense. Justice Cartwright said: "If the existence of a private right and the violation of it are clear, it is no defense to show that a party has been to great expense in preparing to violate the right. The law does not undertake to estimate the difference between the loss that would be sustained by the party owning the thing complained of and of the damage to the injured party, nor to grant or withhold relief on such a basis."

Judge Refused to Grant Temporary Injunction

In a New York case, Russell vs. Popham, 3 New York Legal Observer 272, a judge refused to grant a temporary injunction (a restraint pending determination of the right to a perpetual injunction) against the operation of a coal yard adjacent to plaintiff's dwelling-house. He said: "A coal yard *prima facie,* is not a public nuisance, though it is possible so to use it as to make it noxious to the public. But if the affidavits on the part of the defendant are true, this yard is not so conducted as to be a public nuisance. The alleged injury to the complainant's house by the deposit of coal upon the adjoining lot may be such a private nuisance as to entitle the complainant to the interference of this court, after he has established the fact that it is a real and substantial and continuing injury to his premises, in a suit at law. It would, however, be going much further than the court has heretofore considered itself as justified in going, to interfere by a preliminary injunction upon the state of facts presented."

Recent Developments in the Colorado Strike

At the beginning of December of last year, inquiry was being made into the Colorado strike by both a federal grand jury in Pueblo, and a military commission at Trinidad. Before the former, indictments were brought against John P. White, president of the United Mine Workers of America, Frank J. Hayes, vice-president, and others, in all 25 persons. The jury returned 25 indictments against 24 men, Hayes being charged with obtaining a monopoly on labor and conspiring to restrain trade. The specific charges against those indicted include the stopping of coal destined for interstate purposes, the holding of cars after they were loaded for shipment and the asking of Wyoming operators to withhold coal from Colorado.

The military commission listened to the admission of Robert Uhlich, indicted president of the local union, that he had personally carried arms to the 400 miners at Ludlow, the night before the last battle at that place when a mine guard was killed by a shot. He was arrested and the authorities are seeking his deportation. Born in Saxony where he deserted the army, he fled to France, Spain and Mexico, and did not come to Colorado until 1910.

TWO BASES FOR SETTLEMENT REJECTED

On Dec. 2, the miners refused to accept the proposition of Governor E. M. Ammons for a settlement based on the following understanding: The law forbidding employers to interfere with the joining of unions by their employees or to discharge or coerce them on account of their affiliations was to be enforced. The employment of checkweighmen chosen and paid by the miners was to be allowed and the 8-hr. law was to be obeyed. The workers were to be free to buy their goods and to board where they pleased. The miners were to be paid twice a month. All provisions of the coal-mine inspection law were to be observed and all strikers were to be reinstated except where guilty of acts of violence.

A joint proposition of the governor and of the Secretary of Labor, W. B. Wilson, was that an arbitration committee should be formed consisting of three operators, three strikers and one disinterested party. All questions involved in the strike were to be submitted for adjustment except that of recognition of the union. This proposition was held up until the referendum vote accepting or rejecting the proposal of the governor had been cast.

When, on Dec. 4, the count of the referendum vote revealed a determination on the part of the miners to reject the original proposition, W. B. Wilson met with the operators and endeavored to get them to submit the difference to arbitration, but they refused. So he returned to Washington.

OPERATORS REDUCE PRICE OF COAL

On Dec. 3, the operators declared that the miners were working so steadily that a drop of $1.75 per ton could be made in the price of lignite. It had been $6.50 retail for first grade and $6 for second grade in Denver, for some weeks.

Vice-President Hayes, of the Mine Workers Union, then issued a manifesto stating that the coal offered for sale had been standing since before the strike and that the operators had been trying to make an excess profit of $52,000 per day on it for two months.

On the same day Dec. 3, President J. McLennan and Secretary W. T. Hickey, of the State Federation of Labor, called a convention to meet Dec. 16 to consider a statewide sympathy strike and Dec. 5, nine speakers were sent out to urge such a strike on the labor unions. The miners of the Aguilar district resolved on Dec. 3 to request the district officers to take the necessary steps for the recall of Governor Ammons and General Chase, the latter being at the head of the state militia.

THE MILITARY COMMISSION

On Dec. 6, the military commission reported on 43 cases arising out of the strike. It recommended that five men be held for murder, three for felonious assault, two that their cases may be further investigated and Uhlich as a dangerous agitator and alien.

The commission then took up its investigations at Walsenburg and dismissed 20 men. On Dec. 12, Captain Colesworth was named to relieve Major C. E. Townsend as acting judge advocate with Major Boughton. This was a cause of great rejoicing to the union officials. They alleged that the militia in Major Townsend's district took Andrew Colnar, an innocent Pole, and caused him to dig his own grave on the threat that he would be shot in the morning and taunted him until he fainted and fell in the hole. Further they stated that union officials have been held incommunicado and without charges being made.

The National Socialist party in Chicago and the Young Women's Christian Association sent word to the miners' union, the word arriving on Dec. 13, that they would send money for the support of the children of strikers.

On Dec. 16, Adjutant General John Chase declared that the mines were getting their full quota of men, the Forbes mine, for instance, being about 5 per cent. short and the Ideal having a full quota. The men were leaving the tent villages ostensibly for other states, but many of them sought work in nearby towns as strike breakers. He stated that in accord with the law, all men entering Colorado to seek employment were warned that a strike was in progress.

THE STATE FEDERATION MEETING

The much heralded meeting of Dec. 16, at last convened, but no figures of national importance in other lines than coal mining were in attendance. There were, however, the familiar figures of J. P. White, president, and W. Green, secretary of the United Mine Workers of America, and "Mother" Jones. In all about 450 delegates represented 250 unions. W. Green delivered the following remarks according to the "Rocky Mountain News":

> There was a time when the governor could have rendered a distinct service to the people of the state, but that time has long passed. He should have given the operators one week to arbitrate with the understanding that, if they did not do so, he would instruct the attorney-general to go to court, have a receiver appointed for the coal companies and operate the mines in the name of the state.

It does not appear that Mr. Green's remarks were taken seriously, as his wild suggestions, which are neither just nor of legal force, were not embodied in the resolutions adopted. A visit was made by a committee of five on Governor E. M. Ammons. The committee declared that if the military commission executed anyone, lynching parties would follow.

THE STATE-WIDE STRIKE UNPOPULAR

The federation did not vote for a general strike in Colorado as the delegates thought that Wyoming coal miners should first strike in sympathy. Nevertheless a resolution was passed in a half-hearted way empowering the executive committee of the Colorado Federation of Labor to call a state-wide strike without further formality or notice. This meant but little as the federation officials had the power to make such a call without any such vote.

The meeting supported the resolution of Congressman Edward Keating in favor of a congressional investigation into the Colorado strike, and ordered its approval of the resolution sent to all the Colorado congressmen; it indorsed the single tax, commended Roady Kenehan, the state treasurer demanded the removal of Sheriff J. Farr, of Huerfano County, and condemned the newspaper inquiry into the strike, declaring it representative of only a few papers and stating that the miners were not allowed to talk as long as the operators. It also made the accusation that the judgment was prepared before the testimony was heard. It recommended a constitutional amendment providing for the operating of coal mines by the state and favored the bill permitting cities to file upon federal coal lands for municipal use.

On Dec. 18, the federation ended its sessions, having first arranged to prepare petitions for the recall of Governor E. M. Ammons and having marched to the state house and met the governor and Attorney General Fred Farrar in the house of representatives. The governor agreed to investigate charges brought against the militia and desired the federation to name a committee to assist in the investigation.

On the same day 185 strike breakers were brought into Trinidad from Pennsylvania. About 1500 strikers and sympathizers with the strike met them and were kept back only with difficulty by five companies of militia. On Dec. 19, fighting took place at Oak Creek, Colo., and at the Cameron mine, Walsenburg, Colo., which has been running steadily since the strike commenced.

THE PROGRESSIVE PARTY AND THE STRIKE

On Dec. 22, Merle Vincent, leader of the Progressives on the Western slope, demanded that Governor Ammons send a communication to operators and miners requiring them to recognize and negotiate with each other. Failing results, he should call a special session of the legislature to devise ways and means for operating such mines as are on state lands. Vincent declared the militia, "the body-servants to the operators" and added that the operators could be sued for having organized in restraint of trade.

Four of the five committeemen appointed by the strikers to prepare charges against the militia met on the same day. They were Prof. J. H. Brewster, of the University of Colorado, James Kirwan, of the Western Federation of Miners, Eli M. Gross, of the Denver Cigar Makers Union, and John R. Lawson, of the striking miners. Lawson was elected chairman and Gross, secretary.

Discussion By Readers

The Certificate Law

Letter No. 9—In recent issues of COAL AGE, I have read the opinions of different men as to the advisability of establishing an interchange of certificates, issued by the different mining departments and mining boards in the several coal-producing states of the United States. I am in favor of a law or plan that would bring about an interchange of certificates for such positions as mine managers (mine foremen) mine examiners (firebosses) and hoisting engineers; because of certain cases that have come under my observation, in connection with my work as chief clerk and secretary of the State Mining Board.

Men have made application in Illinois for examination as mine managers, and have had in their possession certificates of competency granted them in other states. These certificates may have been issued several years before, since which time they have acted in the same capacity successfully, for a number of years; but, under the state mining law, they were required to take an examination in practically the same subjects in which they had formerly been examined in another state. Their work had taken up so much of their time that they had not kept up their study and were unable to pass the examination in Illinois. Nevertheless, they were capable and qualified according to the laws of another state to perform such duties and had secured a certificate of competency as required by law.

In most of the states that produce coal, there is created by law, a board or commission or a chief mine inspector, who have charge of the examinations for certificates as mine managers, etc., and the law, in most cases, provides in what subjects the applicant shall be examined. The conditions are very similar. Why then should a man who has passed the examination in one state, and received a mine manager's certificate, be asked to take an examination in the same subjects in another state?

In my opinion, there should be an interchange of certificates, with the possible exception of state mine inspector.

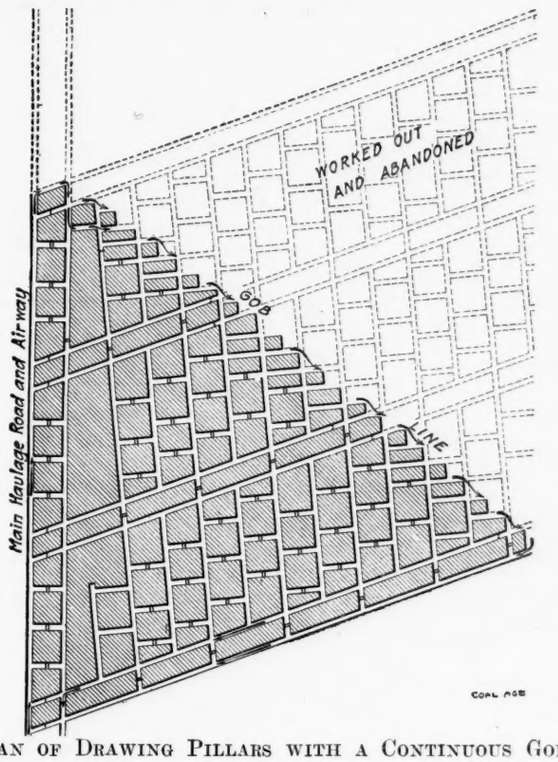
MARTIN BOLT,
Chief Clerk, State Mining Board.
Springfield, Ill.

Extraction of Pillars

I have been greatly interested in the recent discussion bearing on the recovery of pillar coal and submit herewith a plan that has proved very successful in this locality, both with respect to the percentage of coal recovered, the ventilation of the pillar workings and the general condition of safety while drawing back the pillars. The system also favors a minimum cost of production.

As shown in the accompanying sketch, cross-headings are driven off the main haulage road in pairs. These headings are driven on 50-ft. centers and about 300 ft. apart. Rooms are turned to the rise of the cross-headings, the rooms being driven on 80-ft. centers and bear to the left or toward the main headings, about 10 ft. per 100 ft. of length. The grade in the rooms is about 2 per cent.

In this system, the main headings are driven to the boundary line or the limit of the panel, and the work of drawing back the pillars is started at the top rib, on the inby end of the last pair of cross-headings, or the extreme inby end of the panel. Some considerable time is required to develop the full extent of the gob line in a panel or section. As shown in the figure, about seven ribs are all that can be maintained between two pairs of cross-headings. It is important that the development of the gob line should not be rushed too rapidly, but this development should take place regularly, or serious results may follow. Thus, each pillar is stepped back from 35 to 40 ft. before work on the next pillar is started.



PLAN OF DRAWING PILLARS WITH A CONTINUOUS GOB LINE

The method is as follows: The pillar is cut across so as to leave about a 15-ft. stump. When this has been done, a slab of about 4 ft. is taken off on the inby rib. Owing to the angle by which the rooms bear toward the main heading (1 to 10) the cross-cut in the pillar gains about 8 ft. toward the "flat" or cross-heading. On this account, it is clear that the steps in each successive pillar cannot be less than 35 or 40 ft., or much coal would be lost in the stump end when working back.

The ventilation is on the ascensional plan, the air being taken in on the main heading to the inby end and returned along the gob line, as shown in the figure. This is ac-

complished by putting canvas checks in the rooms. By means of canvas hung on the rise-headings, some air is diverted through the crosscuts along the gob line, sufficient to keep these places free from gas. The circulation is so arranged, however, that the most of the air is made to traverse the gob line.

While this is a gassy mine, we have never been troubled with gas on the falls, which proves the efficiency of the system. We always expect to find traces of gas on the top rib, but this is so diluted by the air below the point of ignition that it can only be found by a careful test.

GEORE H. DAVIS,
Asst. Mine Foreman, Thompson No. 1.

Epton, Penn.

Handling Fine Dust in Washing Coal

In the article of J. Drummond Paton on this subject, COAL AGE, Oct. 18, p. 573, the statement is made that "to allow all the small coal under 1 mm. (one-twenty-fifth in.) to pass into the washery is radically wrong." The author further states that the formation of sludge when this and finer dust are allowed to pass into the washery makes the operation of the latter difficult. He explains that not only is the washed fine coal hard to dry but the mass is so dense that the passage of water through it is slow; and, besides, the fine sludge absorbs an immense quantity of water. He concludes that this fine dust cannot be treated successfully in a washer.

The experience of the Keystone Coal & Coke Co., in their washeries at Salem and Huron, would seem to prove the contrary of this claim. These washeries generally get only the sizes of coal that pass through the one and one-fourth-in. bar-screen. But since this coal is mostly cut by machines, it contains considerable fine dust that is high in both sulphur and ash. This condition, therefore, presents such a problem as Mr. Paton claims cannot be handled successfully by washing. I want to say that the rejections at these washeries show a low percentage of coal, not exceeding 5 per cent., while the washed coal shows a satisfactory reduction in ash and sulphur. No water is thrown away, except that which is carried up with the washed coal and refuse and that which is drained out of the tanks once a week for the purpose of inspecting the submerged parts of the machinery.

Before draining the tank, the machinery is always run slowly for a considerable time, in order to save the fine material. That this fine material has undergone an effective separation is proved by repeated analyses, which have usually revealed the following results: Washed coal smudge, sulphur, 1.3 per cent.; ash, 14 per cent. Refuse smudge, sulphur, 5.18 per cent.; ash, 29.5 per cent.

The washed coal smudge here referred to is under one-seventieth in. in diameter and is allowed to pass off from the washed-coal elevator boot along with the overflow water.

A series of tests of the washed coal have shown that sizes down to one-fortieth in. in diameter contain about the same precentage of impurities. Only as the size approaches one one-hundredth in. in diameter, does the material show any great increase in sulphur or ash. For this reason, we aim to draw off only the very finest of the smudge, the rest being good enough to pass up with the washed coal. The fine smudge is not wasted, but is finally allowed to settle out and mixed with the other middlings for the plant boiler fuel.

We have never yet determined here just what proportion of the one-seventieth-in. material passes up with the washed coal. The proportion, however, is probably small, since the greater part of it overflows with the water. Particular attention has been paid to the arrangement of the sluices and settling tanks. The final settling tank, into which all waters flow before returning to the circulating pump, is arranged so that the least possible disturbance of the water occurs. The scrapings from this tank are a mixture of settlings from both refuse-tank water and washed-coal-tank water; and, as previously stated, this goes to the boiler plant. Its analysis is approximately as follows: Sulphur, 2.7 per cent.; ash, 16 per cent.

Our experience leads me to conclude that the dry dust, in the separation suggested by Mr. Paton, could not be handled as easily and economically, in our case, at least, as the smudge we are handling at the present time; and it is certainly being washed fairly successfully, as is proved by the analyses.

E. C. TAYLOR, Supt.,
Keystone Coal & Coke Co.

New Alexandria, Penn.

Grand Jury Investigates Strike Situation

Referring to the editorial, Two Phases of the Colorado Strike, COAL AGE, Dec. 20, p. 943, allow me to draw attention to the following rulings of the federal grand jury, bearing on the strike situation.

The federal grand jury investigating the coal strike in Colorado recently issued a statement relative to conditions in the mines in which it says: "The operators appear to have been somewhat remiss in endeavoring to secure and hold the good will of their employees, and the grand jury has deduced from testimony that there existed reasonable grounds for many of the grievances complained of by the miners. We believe that many of these complaints are substantiated and have merit."

The grand jury found that the state laws have not been so enforced as to give all persons concerned the benefits which are derived therefrom, and that "the coal companies have been sufficiently influential to nominate, elect and control many county officers, and have done so with the result of complicating the industrial situation by excusing political prejudices."

The report further sets out that "many camp marshals whose appointments and salaries are controlled by coal companies have exercised a system of espionage and have resorted to arbitrary powers of police control, acting in capacity of judge and jury and passing sentence upon miners who had incurred the enmity of the superintendent or pit boss for having complained of real grievances or for other causes. These, taken with assaults by camp marshals upon miners, have produced general dissatisfaction among miners, who fear generally to complain of real grievances because of danger of their discharge."

Viewed in the light of these grand-jury investigations, the present labor trouble in Colorado does not appear to have all the right and justice on the side of the mine owners.

A CONSTANT READER.

How To Buy Coal

Letter No. 1—I have read with considerable interest the article by J. S. Burrows, entitled, How to Buy Coal, COAL AGE, Dec. 6, p. 866. While Mr. Burrows has demolished, by very logical arguments, the preconceived ideas of a large number of purchasers of coal, and even admits that he was one of the originators of the heat-unit system, he, nevertheless, offers no substitute.

I quite realize that in the chemical analyses, by sample, of several hundred tons of coal, the result is more or less subject to error; but, if the net result of a series of samples of different lots is taken, say an average of ten separate analyses, would not the result be as much to the advantage of the seller as the buyer. While the sample of one or two lots might show an excessive proportion of ash, sulphur, or a low-heat value, it cannot be denied that subsequent analyses might give the advantage to the seller. An average, therefore, of, say ten analyses of samples, taken from as many distinct deliveries of approximately equal quantities of coal, would at least give a fairly good general idea of how the coal was running, and whether or not the seller was living up to the standard required by the contract.

The purchase of coal for bunker purposes differs materially from that for shore use; and, aside from the effort to obtain suitable coal for steaming, careful consideration should be given to the elimination of any risk of spontaneous combustion, especially where the vessel is to be bunkered for a long voyage during which the coal will be subjected to climatic changes. In such cases, it is very difficult to arrive at a practical result, owing to the difference in steamers, engineers, firemen, weather conditions, etc.

Until some better and more reliable method is established, therefore, it is fair to assume that the purchaser is safeguarded, at least to some extent, against a poorer grade of coal than is guaranteed by the seller, and the latter will suffer no hardship by the present system provided that he intends to live up to the conditions of his contract.

In the case of bunkering steamers, it seems to me that a fair way of sampling is to take a small sample of coal from each or every other bucket, keeping the samples taken from each barge separate; and after thoroughly mixing each lot reduce the amount in the customary manner to a quantity sufficiently small to analyze. I believe this would give a net result that would demonstrate, with a degree of fairness, the quality of the coal delivered.

W. J. RAEBURN.

New York City.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

RATIO AND PROPORTION

Ratio—The word "ratio," as used in mathematics, expresses the numerical relation that one quantity bears to another of the same kind. The two quantities so related or compared are called the "terms" of the ratio; and the two terms taken together are called a "couplet."

How Expressed—A ratio is expressed in two ways:

1. By writing the two terms with a colon between them; thus, the ratio of 2 to 4 may be written 2:4 and is read 2 is to 4.

2. By writing the terms as a fraction; thus, the ratio 2:4 may also be written 4/2, the first term of the ratio being preferably made the denominator and the second term the numerator of the fraction.

When so written the ratio may be read as before "2 is to 4"; or, as is frequently done, "4 divided by 2," which expresses the fact the ratio is intended to convey; namely, that the first term of the couplet 2:4 is a base or standard of measurement for the second term, and the ratio shows how many times the second term will contain the first, or expresses the value of the second in terms of the first or standard.

The Meaning of Ratio—To illustrate the meaning and use of ratios, in mining problems:

Nitrogen gas is 14 times as heavy as the same volume of hydrogen, and the ratio of the weights of equal volumes of these two gases is therefore 1:14. In this case, hydrogen is made the base or standard of measurement.

Again, a cubic foot of anthracite (hard coal) is, practically, 1½ times as heavy as a cubic foot of water, and the ratio of the weight of anthracite to that of water, volume for volume, is therefore 1:1.5. Here, water is the standard and the weight of the coal is calculated from the known weight of the standard.

Ratios are useful in the calculation of many problems in mine ventilation, where it is often desired to calculate the volume of air a given power will circulate in one airway of a certain size, from the circulation produced in another airway of known size, which is taken as the standard.

A Simple Ratio—A simple ratio is one formed of a single couplet of like terms only; as when length is compared with length, or width with width.

Example—If one strip of carpet contains 10 sq.yd., how many square yards are there in another strip of the same width but twice as long?

Solution—These strips of carpet differ only in length, the length ratio being 1:2; or 2/1 = 2. Hence, the number of square yards in the second strip is found by multiplying the number of yards in the first strip by this ratio. Thus, 10 × 2 = 20 sq.yd.

In this case the ratio is a simple ratio, because it is expressed by a single couplet the terms of which both refer to the length of carpet in the strips. This is possible, because the width of the strip is the same in each case and need not therefore be considered.

The Coal Age Pocket Book

A Compound Ratio—A compound ratio is one formed of two or more couplets, the terms of which are different for each couplet. In other words, a compound ratio involves two or more simple ratios of different kind.

The value of a compound ratio is determined by multiplying together the first terms of the several couplets, for a new first term; and, likewise, the second terms of those couplets, for a new second term. The resulting ratio is the value of the compound ratio.

Example—If a certain strip of carpet contains 12 sq.yd., how many square yards will there be in another strip twice as wide and three times as long?

Solution—In this case, two simple ratios are involved. The width ratio is 1:2, and the length ratio 1:3, which together form a compound ratio that may be expressed by the products of the corresponding terms. Thus,

$$(1 \times 1) : (2 \times 3); \textit{ or simply } 1 : 6$$

The number of square yards in the second strip of carpet is, then, 12 × 6 = 72 sq.yd.

Example—A certain mine sump, 6 ft. wide, 14 ft. long and 11 ft. deep, holds when full 6912 gal. of water; what is the capacity of another sump that measures 7 ft. in width, 12 ft. in length and 6 ft. in depth?

Solution—These sumps differ in all three dimensions, width, length and depth. The width ratio is 6:7; the length ratio 14:12; and the depth ratio 11:6. The compound ratio of capacity, is therefore, in this case,

$$(6 \times 14 \times 11) : (7 \times 12 \times 6); \textit{ or } 924 : 504$$

This ratio can be reduced by dividing both terms by 84, which is their greatest common divisor; or by canceling the common factors in the two terms of the compound ratio; thus,

$$(\overset{2}{\cancel{6}} \times \overset{}{\cancel{14}} \times 11) : (\overset{}{\cancel{7}} \times \overset{6}{\cancel{12}} \times \overset{}{\cancel{6}}) = 11 : 6; \textit{ or } \tfrac{6}{11}$$

The capacity of the second sump or basin is, then,

$$6912 \times \frac{6}{11} = 3770+ \textit{ gal.}$$

To Reduce a Ratio—To simplify the working of problems all ratios should be reduced to their simplest form, by writing the ratio as a fraction and reducing this fraction to its lowest terms.

For example, the ratio 12:16 when reduced to its simplest form is

$$\frac{16}{12} = \frac{4}{3}; \textit{ or } 3 : 4$$

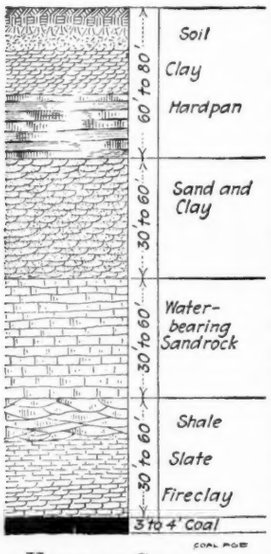
The terms of any compound ratio consist, each, of the corresponding terms of the simple ratios of which it is formed. These simple terms enter the compound ratio as factors or "elements," as they are called. In reducing a compound ratio, cancel the equal elements and factors in each term.

Inquiries of General Interest

Working Coal under Watery Strata

We are starting to develop a coal property that presents an interesting and difficult problem in mining. Having noted the previous valuable discussion on working coal under sandstone cover, allow me to present the following proposition for the discussion of readers:

We have already sunk an air shaft to the coal, which lies about 200 ft. below the surface. The shaft is making 500 gal. of water per minute, which all comes practically from the water-bearing sandrock, so marked in the accompanying section. This sandstone is not stratified and the water flows through it freely in every direction.



VERTICAL GEOLOGICAL SECTION

In order to assist in sinking the air shaft mentioned, we drilled two 10-in. boreholes, one on each side of the shaft and about 50 ft. distant from the same. We pumped about 150 gal. of water per minute from each of these holes; and the sinking of the shaft did not seem to affect the flow in either hole, even after the shaft had penetrated and passed through the sandrock from which the water came. The natural head of the water is about 100 ft. above the sandrock, which extends for miles in all directions from the shaft. The source of the water is unknown, there being no large bodies of water closer than 15 miles. I would like to suggest the following questions for discussion by readers:

1. If the coal in this seam is taken out to such an extent as to break the sandrock, would it be reasonable to expect the same flow of water from each break as what finds its way into the shaft?

2. Assuming we can handle from 1000 to 1200 gal. of water per minute, in this mine, and estimating that it will be necessary to leave about 50 per cent. of the coal in place, in order to prevent breaking the rock, would it be advisable to leave such a large percentage of coal for the support of the overlying strata? Under ordinary mining conditions we would expect to take out from 80 to 85 per cent. of the coal.

3. We expect to sink a hoisting shaft about 300 ft. from the air shaft. Will this shaft make the same amount of water as the air shaft?

GEO. MACPHAIL, Engr.,
What Cheer Coal Mining Co.

Bay City, Mich.

[This is a problem of great interest in coal mining. Our correspondent has given little information in regard to the geological cross-section of the locality. The vertical section given, however, shows approximately the character of the strata overlying the coal seam, and it may be assumed that the location of the shaft is in the basin, at or near the bottom of the syncline. Here is an opportunity for practical mining men to give helpful suggestions, by citing instances in their own experience. Let us have a good discussion of the question.—ED.]

Weathering of Coal

Recently, I read a statement to the effect that a small pile of coal that had become heated to a temperature of 165 deg. F., later cooled down to the normal. As this is contrary to general experience in the practice of storing coal, I would like to ask if such a statement could be correct.

In the storage of coal, is the idea of ventilating the pile in order to reduce the heat generated, of practical value; or, in other words, can the idea be applied to advantage in the storage of coal in large heaps or in bunkers?

PURCHASING AGENT.

Philadelphia, Penn.

Opinion varies widely in regard to the immediate cause of the generation of heat in a coal pile. There are unquestionably a number of contributory causes, all of which produce a greater or less effect and assist or retard the generation of heat in the coal. One of the most potent of these causes, probably, is the absorption by the coal, of the oxygen of the air. The oxygen thus absorbed is brought into intimate contact with the carbon of the coal. The absorption of oxygen is greater in the small sizes of coal, owing to the greater surface exposed to the atmosphere, for the same mass concerned.

Moisture, the presence of sulphur in the coal, the hardness and cleavage character of the coal, are all factors that assist or retard the reaction that takes place between the carbon and the oxygen. This reaction generates heat, which in turn accelerates the oxidation of the coal.

The purpose of ventilating the pile would be to carry off the heat generated in this way. The idea, however, is not generally regarded as of practical application, not only for the reason that it is impracticable to ventilate a large coal pile or storage bin thoroughly throughout its mass; but the air introduced into the pile of heated coal furnishes the necessary oxygen to carry on the combustion.

Coal stored in bunkers should be kept as dry as possible and the space above and around the coal should be thoroughly ventilated. It is possible, although exceptional, for a coal pile that has started to heat, to cool down again under favorable climatic conditions respecting temperature and moisture in the air. Climatic conditions have a greater effect on the tendency of coal piles to heat than is generally supposed. This has been clearly shown by the difficulty experienced in seagoing vessels sailing in different climes.

Examination Questions

Miscellaneous Questions

(Answered by Request)

(*Concluded from last issue*)

(b) The introduction of a regulator in an airway has practically the same effect as increasing the length of the airway and will increase the water gage, for the same power on the air.

(c) For a constant power on the air, the pressure or water gage varies inversely as the quantity of air in circulation; in other words, the water-gage ratio is equal to the inverse quantity ratio. Calling the required water gage x and assuming an original water gage of 2 in.,

$$\frac{x}{2} = \frac{20{,}640}{12{,}250}$$

$$x = \frac{2 \times 20{,}640}{12{,}250} = 3.37 \text{ in.}$$

(d) For the same conditions in the airway and the same opening in the regulator, the power required to increase the circulation to the original amount, and the resulting water gage are determined by the rule that the power varies as the cube of the quantity and the water gage as the square of the quantity. In other words, the power ratio is equal to the cube of the quantity ratio, and the water-gage ratio is equal to the square of the quantity ratio. Calling the required power and water gage x, respectively, the original circulation being 6.5 hp. and a 2-in. water gage, we have

Horsepower, $$x = 6.5\left(\frac{20{,}640}{12{,}250}\right)^3 = 31.09 \text{ hp.}$$

Water gage, $$x = 2\left(\frac{20{,}640}{12{,}250}\right)^2 = 5.68 \text{ in.}$$

Ques.—If a true meridian line is established and the declination of the needle is known to be 4 deg. east of north, will the needle of a compass when unlocked read N 4° E?

Ans.—Assuming there is no local attraction to deflect the needle, it will point to the magnetic north when unlocked. If the sights of a simple compass having no declination plate be directed to the true north so that the sight line of the compass will correspond with the established true meridian, the reading of the needle will be N 4° E.

If, however, the compass has a declination plate and the declination of the needle is set off, 4 deg. to the east of north, the reading of the needle will then be zero; because, in setting off the declination on the compass, the zero of the limb or graduated circle has been moved 4 deg. to the right of the sight line of the compass. In this position, the north and south points of the graduated circle coincide with the magnetic meridian when the sight line of the compass is in the true meridian.

Ques.—If a given power produces 60,000 cu.ft. of air in three airways, each 6 ft. high, 8 ft. wide and 4000 ft. long; what quantity of air will the same *power* produce when one of these airways is closed?

Ans.—For the same power on the air, the quantity of air in circulation in a mine is directly proportional to the total sectional area of the airways or area of passage, and inversely proportional to the cube root of the rubbing surface. Assuming that each of the three airways, in this case, starts from the bottom of the downcast and returns to the foot of the upcast, making three separate splits of air, and ignoring the shaft or slope resistance, both the total sectional area and rubbing surface for the entire mine will be proportional to the number of airways or splits. This is true, since the airways are all of the same size and length.

Then, the quantity of air in circulation being proportional to the sectional area and inversely proportional to the cube root of the rubbing surface, the quantity ratio is equal to the area ratio times the cube root of the inverse rubbing-surface ratio; and, since there are 3 splits in the first case and 2 splits in the second, calling the required quantity of air x,

$$\frac{x}{60{,}000} = \frac{a_2}{a_1}\sqrt[3]{\frac{s_1}{s_2}} = \frac{2}{3}\sqrt[3]{\frac{3}{2}} = 0.7632$$

and

$$x = 60{,}000 \times 0.7632 = \text{say } 45{,}800 \text{ cu.ft. per min.}$$

The above method, by ratios, is the simplest, most direct and accurate method of calculating such problems.

Ques.—The depth of a downcast shaft is 600 ft. and the temperature 50 deg. F.; the depth of the upcast is 900 ft. and its temperature 100 deg. F. What water gage should result from this condition?

Ans.—Assuming the given downcast temperature (50 deg.) represents the temperature of the outside air, the height (h) of air column producing circulation in this mine, estimated in terms of the air in the upcast shaft, is

$$h = D\frac{T - t}{460 + t} = 900\frac{100 - 50}{460 + 50} = \frac{900 \times 50}{510} = 88.23 \text{ ft.}$$

The weight of 1 cu.ft. of the upcast air, at a temperature of 100 deg. F., assuming a barometric pressure B = 30 in., is

$$w = \frac{1.3273\,B}{460 + T} = \frac{1.3273 \times 30}{460 + 100} = \frac{39.819}{560} = 0.0711 \text{ lb.}$$

The pressure due to 88.23 ft. of air column of this air is then

$$p = w\,h = 0.0711 \times 88.23 = 6.28$$

The water gage corresponding to this pressure is

$$w.g. = 6.28 \div 5.2 = 1.2 \text{ in.}$$

Correction

(*Examination Questions, Nov. 8, p. 711*)

Ques.—The anemometer indicates a velocity, etc.

Ans.—The answer should read as follows:

(c) The water gage is 2.08 ÷ 5.2 = 0.4 in.

Coal and Coke News

Washington, D. C.

The Interstate Commerce Commission has handed down an unusually important decision in the case of the Traffic Bureau of Nashville vs. the Louisville & Nashville R.R. Co. In this it is found that conditions affecting the transportation of coal from Louisville & Nashville R.R. western Kentucky mines to Louisville, Memphis and Nashville are not so dissimilar as to preclude a comparison of rates from the same fields to these three cities. The rate of $1 per ton on coal to Nashville from Louisville & Nashville mines in western Kentucky is found to be unreasonable and a rate of 80c. is prescribed.

A like rate from Nashville, Chattanooga & St. Louis Ry. mines in Tennessee and Alabama is found to be unreasonable and a rate of 90c. is prescribed. It is held that the current complaints as to the unreasonableness of the rate of $1 to Nashville on coal from Illinois Central western Kentucky mines had not been sustained.

With reference to the question of refusal on the part of the Louisville & Nashville and Nashville, Chattanooga & St. Louis to switch coal to and from the Tennessee Central, as well as the practice of the latter in retaliating in kind is held to be unreasonable while the practice of the first two roads is said to be unjustly discriminatory. Finally it is held that a carrier may not exercise any arbitrary discretion in saying what roads and what traffic it will admit to its terminals and what shall be rejected.

The decision is of special interest because of the elaborate discussion it affords with reference to the use of statistics showing ton-, car- and train-mile movements as a basis for the making of rates. In this connection, speaking specially of coal movements the commission says in its decision:

Ton-mile statistics, reflecting as they do neither car loading, train tonnage, nor car- or train-mileage, are far from being infallible guides in fixing freight rates. A high average ton-mile revenue may be due to short hauls, a preponderance of which occasions the railroad traffic manager much uneasiness, while it has been repeatedly shown that traffic low in ton-mile earnings may, because of its farther carriage and greater density, be the most remunerative. Per-car earnings, with distance considered, are much more reliable.

Where the commodity moves in trainloads the earnings per train-mile furnish the best criterion, not only the car loading, but also such physical conditions as grades, etc., being here reflected. Comparisons of any kind, however, to be effective must be analogous, or nearly so; that is, the the rate charged or gross earnings derived on any basis for the transportation of a given commodity between two points furnishes a guide in arriving at the rate to be charged upon the same or nearly the same commodity between two other points similarly circumstanced.

Comparisons made with coal moving to the lakes for transshipment, to tidewater and between points in central freight association territory are of little value here because of the manifest difference in transportation conditions, particularly with respect to density of traffic, train tonnage, and return empty hauls.

Chattanooga, Knoxville and East St. Louis have coal mines in their immediate vicinities, and such juxtaposition of supply and market must needs exercise a material influence over the rates from farther distant mines thereby lessening the strength of the comparison.

In analyzing the actual tonnage situation, the commission points out that the $1 per ton rate to Nashville has been in effect since 1888 and has therefore remained unchanged for 25 years and that as the volume of traffic has greatly increased there is ample reason to believe that the proportionate share of revenue obtained from the hauling of coal in this way is much greater now than it was then so that a reduction is reasonably to be expected. No award is made of reparation for past charges.

The Rate Increase Controversy

An increasing number of coal producers are preparing to participate in the 5% rate advance controversy with the railroads and are filing statistics in opposition. The roads themselves are beginning to appreciate the character of the antagonism they must meet from this source and are getting ready to show statistically the situation under which they are laboring in coal territory.

Among the recent data filed by the roads are statistics showing that there has been an enormous increase in wages. According to this analysis the various railroad companies paid out $506,000,000 in wages and salaries in the year ending June 30, 1913 Estimates for 29 of the 38 railroad systems concerned show an increase in wages for 1913 over 1910 of $48,618,972.41, due to changes in rates of pay and working conditions.

This figure was obtained as a result of a request to the railroads to take the actual performance for the year ending June 30, 1913, and compare the rates of pay and working conditions prevailing in that period with those in effect in October, 1909, a period prior to the date of the important increases.

In addition to the increases up to June 30, 1913, careful estimates show that the increases in wages recently granted to the firemen, conductors and trainmen will add not less than $8,750,000 more to the expenses of the railroad, this estimate being based on the volume of business for the calendar year 1912.

In addition to the wage increases granted in the calendar year 1910, a small portion of which was effective in the fiscal year ending June 30, 1910, the engineers, firemen, conductors and trainmen have been awarded increases through arbitration proceedings amounting to $10,350,000 per annum on the eastern railroads, and increases in rates of pay have been granted to various other classes of labor amounting to large sums in the aggregate in addition to those granted in the year 1910.

Taken altogether, there has been an increase of 10.62 per cent. in the average rates of pay on these railroads in 1913 over 1910. Special data are also being prepared with reference to wage conditions in the coal regions.

Experiment Stations Are Popular

More bills for the establishment of mining experiment stations have been introduced within the past few days, one by Mr. Taylor, of Colorado, who calls for 10 such stations with elaborate functions, another by Mr. Hensley, who would create one such station at Flat River, Francois County, Mo. There seems to be little reason to expect that any action will be had on these proposals for experiment stations any more than on the numerous propositions of the same kind that have come to the front in past years.

HARRISBURG, PENN.

The Auditor General has made his first ruling under the new law taxing anthracite coal, effective the first of the year. It relieves operators of the payment of the tax on as much coal as is necessarily and exclusively used in the operation of their collieries.

This ruling provides that as much of the mined product as is burned for lighting or heating the mines or connected offices, or in providing steam or electric power to run fans or other machinery used in coal operating is to be tax free.

The Auditor General, however, draws a sharp line between coal used for such purposes and coal used at the collieries for the production of light, heat or power for other purposes. Some companies supply light to the dwellings they own, and in such instances and in cases where light, heat or power is sold, the coal will be taxed.

A rather curious question, of interest in many communities in the Anthracite country, has been put up to General Powell by county officials who ask whether coal pumped from river beds, where it has been deposited by floods, is subject to the tax. While the point has not been formally ruled upon, the department is of the opinion that such coal is taxable.

Lively interest in the new tax is being shown by officials of the anthracite counties for the reason that it is expected to make important additions to the revenues of their cities, boroughs and townships. Half of the tax collected will be retained by the state.

Rules Will Likely Be Issued Soon

While the Chief of the Department of Mines, Jas. E. Rodenck, has made no official announcement it is generally expected that rules promulgated at the recent conference of mine inspectors held in Reading will shortly be issued.

Among the rules is one which provides that coal companies in the anthracite fields employ patrolmen, whose duties it will be to make an inspection of the face of pitching breasts, at least once a day. The idea is to promote safety and to have first-hand assurance that no pockets of gas have escaped nor that there is danger of squeezing or of falling roof. This will probably mean the employment of at least

a half dozen patrolmen at each individual colliery. None but practical and long experienced miners can be given the position.

Another order will force the elimination of fuses and caps in blasting. Electric batteries must be used and the miner and his laborer must descend the breast and be present at the starting of the battery.

PENNSYLVANIA

Anthracite

Larksville—Employees of the Lance No. 11 Colliery of the Lehigh & Wilkes-Barre Coal Co., who have been on strike for two weeks, have gone back to work, pending a settlement of their grievance. Until the matter is heard and settled by the Conciliation Board, District Vice-President Yannis will act as check weighman, in place of Joseph Bogden, the discharged check-docking boss, who will still be paid by the men until the matter is settled.

Moconaqua—Mine workers throughout the anthracite field are interested in a question raised by the miners employed at the West End Coal Co.'s mine a Moconaqua, who ask that surveyors be required to join the union. It is the contention of some of the district officers that such a course is not legal, and a report on the situation is to be made at the next district meeting.

Lansford—Three collieries of the Lehigh Coal & Navigation Co., in Panther Creek Valley, are idle owing to a strike involving 2000 employees. At collieries Nos. 5 and 6 the drivers were requested to report 20 minutes before the regular starting time so that their mules would be harnessed in time. This they refused to do, and all the other employees went out on strike with them.

Scranton—The Delaware, Lackawanna & Western R.R. tracks which run from the Keyser Valley yards to the Pyne breaker in Taylor borough subsided recently from a mine cave, so that traffic was interfered with for some time. Extreme precautions are constantly taken to guard against disturbance of the main line, and it is not likely that such an occurrence will take place.

Bituminous

Harwick—The fanhouse of the Allegheny Coal Co.'s mine here was wrecked by an explosion of dynamite Christmas night. Three men whose names appear on the commitments as John Doe, Richard Roe and John Dinamiter have been arrested. They were traced to "Dinamiter's" home by footprints in the snow, which led from the scene of the explosion. Guards have been kept at this mine since Oct. 8, when a riot occurred, but these were eluded by the miscreants in the darkness. Despite the dynamiting of the fan, the mine operated the next day as usual.

WEST VIRGINIA

Wheeling—A canvass of the mining situation of the state shows that there are only about 50% of the miners at work at the present time. Of a total of 72,000 coal miners, there are but little more than 25,000 working. Unless there is a decided improvement in the iron industry, it is feared that these conditions will not be better before spring.

Morgantown—Only one day was allowed for the miners' Christmas by the Elkins Coal Co. Notices posted earlier in the week ordered back to work every miner on the 26th, and all but a few responded. Every mine of the company is running to capacity despite the fact that the coke market remains bad.

Prince—Work was recently begun for the operation of the old Royal mine at this place. The premises are being rehabilitated generally. The houses, tipples, tracks, etc., are undergoing repairs and the first property to ship coal out of Raleigh County will be shipping coal again before many weeks.

Elkins—A. P. Brady, formerly of the Brady Coal Co. will shortly take over the Leroy mines at Coalton owned by W. H. Green and operate the same. Mr. Green has made arrangements to operate the mine at Weaver.

KENTUCKY

Madisonville—It is reported in the western Kentucky coal fields that the interests which have been attempting to effect a consolidation of a number of the larger operating companies for several years, have practically closed a deal involving the transfer of about 5000 acres of coal lands in the Kirkwood field, and that other fields in that section will be taken up shortly. The statement is made that some of the money has been paid over for the deal just completed. C. H. Murphey has been working on the consolidation project for several years.

Lexington—At a recent meeting of the executive committee of the Kentucky State University, it was decided to begin the short course in mining enginering, which has proved very popular, on Apr. 1, instead of at the beginning of the summer term, as has been the practice heretofore. The change was decided upon in order to make the course better suited to the convenience of the miners who make up the greater number of the students.

TENNESSEE

La Follette—The strike at the Rex mines of the La Follette Coal, Iron & Railway Co. has been settled and the mines once more are in full operation.

ALABAMA

Birmingham—The Birmingham Railway, Light & Power Co. has closed a three-year contract with the Alabama Co. for approximately 140,000 tons per year of Lewisburg washed slack. This is one of the largest contracts in the South, and many of the operators were bidding on it. The contract is made on a guaranteed analysis, on the basis of a penalty and bonus clause.

OHIO

Shadyside—The Webb mine of the George M. Jones Coal Co., which is being opened near Shadyside, Ohio, will soon be ready for operation. Entries are being driven and from 40 to 50 cars a week of coal are being loaded therefrom. The material for the steel tipple is on the ground.

Columbus—Miners in Ohio are not assured of the passage of the anti-screen law as recommended by the Ohio Mining Commission, but will have to fight before the Ohio General Assembly to secure the passage of the bill. Operators announce that they will put up a stiff fight to prevent the enactment of the law which will give operators in other fields all the advantage.

A number of the larger employers of labor in Ohio, including quite a few coal operators, have elected to carry their own insurance under the new compensation law rather than to pay into the Ohio State Board of Awards a certain percentage of their pay-rolls. Rules for the corporations and individuals to carry their own insurance have been promulgated by the Board of Awards and the experiment will be watched with considerable interest by other coal concerns in the Buckeye State. The employer is compelled to settle all claims on the same basis as the Ohio State Board of Awards.

INDIANA

Bicknell—It is reported that two men were killed by an explosion of gas in the Indian Creek coal mine early on Dec. 29. Practically all the night shift of 150 men had just come to the surface when the explosion occurred. Work was immediately begun to recover the dead.

ILLINOIS

Springfield—Representatives of 50 Illinois mines recently met in Springfield and organized the Central Illinois Coal Operators' Association. This organization has as its principal object the carrying on of negotiations and effecting agreements with labor organizations interested in coal mining in central Illinois, furthering the safeguarding of life and property and advancing in every way the industry of coal mining. No mines affiliated with railroad companies are included in the organization.

De Soto—H. O. Ozburn, of Murphysboro, has been appointed receiver for the J. B. Kreikemeier Coal Co., at this place. The receivership was made necessary by the failure of the company to meet the pay-roll on Dec. 15, and the trustee for the bondholders applied for the receivership. The mine has been producing about 500 tons a day and is in excellent condition, but the property never made money for anybody, and several have lost fortunes in the past 10 or 15 years trying to operate it.

Murphysboro—Christmas in the mining districts of southern Illinois this season was perhaps one of the bluest that the miners have experienced for several years. Throughout the mining districts the Elks and other fraternal societies brightened the occasion by their liberal donations to those who were needy.

New Baden—The blacksmith shop, machine shop and storage room of the New Baden mine of the Southern Coal, Coke & Mining Co., of St. Louis, was destroyed by fire Christmas night.

ARKANSAS

Fort Smith—State Mine Inspector Shaw recently closed mine No. 2 of the Western Coal & Mining Co. at Denning. Failure of the company to comply with instructions relative to the construction of an air-shaft is given as the chief reason for closing the mine, which is one of the largest in this section of the coal field.

COLORADO

Trinidad—According to figures recently given out by local operators the coal production in the southern Colorado fields, is about 60 per cent. of the normal output.

Denver—It is reported from the coal mining district, where several thousand men have been on strike for some months that the industrial strike was forgotten on Christmas day and good-will prevailed. Christmas exercises were held in each of the strikers' tent colonies, huge Christmas trees being gaily decorated and loaded with gifts for the children, the United Mine Workers of America providing 8000 baskets of candies, fruits and sweets. In the militia camps also decorations were numerous.

FOREIGN NEWS

London, England—Among the most interesting of the specimens brought back by the Scott Antarctic Expedition are some pieces of coal found by Captain Scott's party in latitude 85° south in the middle of the frozen plateau that stretches from King Edward's Land to beyond the South Pole.

PERSONALS

F. J. Devlin, recently superintendent of the Santoy, Ohio coal mines, has been transferred to the superintendency of the Jones & Adams Coal Co.'s Peerless Mine, at Springfield, Illinois.

J. E. Beebe, formerly of the Black Diamond, has recently allied himself with the Old Ben Mining Corporation. The offices of his new employers are in the McCormick Building in Chicago.

William Moody, superintendent of the Sunnyside coal mines, near Evansville, Ind., and a well known figure in the coal trade in southern Indiana and western Kentucky, was stricken with paralysis a few days ago and is not expected to survive.

George Wolf, of Davy, W. Va., was recently appointed general manager of the Superior Pocahontas Coal Co. at Davy, and the Winding Gulf Colliery Co., of Winding Gulf. The latter firm has mines on the Chesapeake & Ohio and Virginian railroads.

William Hartman has been appointed mining inspector for the second district of Illinois, vice Thomas Hudson, of Galva, term expired. George L. Morgan, of Benton, has been appointed inspector for the tenth district, vice Thomas Little, of Murphysboro, term expired.

David Z. Thrush and Patrick Hogan of Farmington and Canton, Ill., respectively, have been appointed state mine inspectors. Mr. Thrush who at the present time is county mine inspector, succeeds James Taylor, of Peoria, who recently tendered to the governor his resignation.

Henry H. Otto, of Wilkes-Barre, has been appointed Division Engineer of the Lackawanna Division of the Lehigh Valley Coal Co., with headquarters at Pittston, to succeed G. P. Troutman, who recently resigned to accept the position of Assistant General Manager of Markle & Co.

OBITUARY

Thomas A. Ritson, a prominent citizen of Steubenville, Ohio, and one of the most experienced mine bosses in that section, died recently at Gill Hospital as the result of an operation. Both in Ohio and West Virginia, he repeatedly carried to a successful conclusion the work of clearing up and putting mines in shape after explosions and floods. It was in his work as a mine boss and expert that he was a valuable man to coal operators.

CONSTRUCTION NEWS

Johnstown, Penn.—A. W. Hoy was recently awarded the contract for building a tipple at the Park Hill Coal Co.'s plant above Conemaugh.

Zanesville, Ohio—The Blue Rock Run Coal Co. has recently started work on a coal mine on the Thornton Olden farm in Harrison Township.

Newport News, Va.—It is expected that the new steel coal pier which is being built at a cost of $1,500,000 will be completed on or shortly after Jan. 1, and will be immediately ready for the dumping of coal. This dock is the largest in the United States, being 1200 ft. long and having a capacity of 40,000 tons of coal daily. It is believed that at least two of the old piers will be abandoned when this one is completed.

Meyersdale, Penn.—A contract has been signed between the Brothers Valley Coal Mining Co. and the Penn Public Service Co. whereby by the middle of March, the former firm's large plant, near Berlin, will be operated by electric power furnished by the Service Co. The Brothers Valley Mines are now operated by electricity, steam and compressed air. The output is expected to be increased and at a less proportionate cost.

St. Louis, Mo.—Work was recently started on the $2,000,000 coke oven plant, which the Laclede Gas Light Co. will build on a 200-acre tract between South Broadway and the Mississippi River, Klausmann's Grove and Jefferson Barracks. The plant will have 56 ovens with a daily producing capacity of 750 tons. The coke will be made from Pennsylvania bituminous coal, brought to St. Louis on barges by way of the Ohio and Mississippi Rivers.

Millsboro, Penn.—Announcement has been made that Millsboro, which is in the center of the predicted coal and coke development of Washington and Greene counties is to have a new industry in the form of a powder and explosive plant of the Lowintite Explosive Manufacturing Co. A location has been secured upon the farm of James Allen and the plant will be in close proximity to the extensive coal fields which are just beginning development. It is planned to deliver powder by motor trucks within a radius of 20 miles.

Barbourville, Ky.—It is reported that the Louisville & Nashville is considering estimates on the cost of double-tracking its Cumberland Valley division, the additional trackage being necessary on account of the heavy coal traffic from the Harlan county field. The Harlan mines are now averaging an output of 160 cars a day, and this production will be largely increased in the future. It is said that about 600 cars of coal a day from the several southeastern Kentucky fields pass Barbourville for Corbin, Ky., where they are transferred for movement north or south. This heavy movement has become so difficult to handle that it is interferring with the passenger traffic, and the company has come to the conclusion that double-tracking is the only solution of the problem.

Norton, Va.—An extension by the Southern Ry. of its line now terminating at Norton, Va., operated by the Interstate Railway Co., is the latest railroad project announced for the purpose of giving the eastern Kentucky coal field an outlet to the Atlantic coast. The extension which seems to have been definitely approved, will pass through the headwaters of Guests' River and the Pound River, both of which are important coal and timber districts of Wise County, and thence through Pound Gap into Kentucky, a total distance of about 25 miles. It is stated that the construction of the road will be started within the next 60 days. Other projects which have been discussed recently are still on the program, and it seems certain that several new lines will be completed into eastern Kentucky during the coming year.

NEW INCORPORATIONS

Cincinnati, Ohio—The Murdock Coal Co. has applied for permission to increase its capital stock from $10,000 to $20,000.

Scranton, Penn.—The Plymouth Red Ash Coal Co. was recently incorporated under the laws of Pennsylvania with a capital stock of $10,000.

Hazard, Ky.—The Eastern Kentucky Coal Co. has been organized with a capital stock of $250,000 to develop 40,000 acres of coal land in Perry County.

Rockford, Ill.—Samuel G. Duran, of Philadelphia, Fayette S. Munroe, of Harlem Park, Ill., and others have formed a company to build a steam railroad to tap the coal field of Kankakee County.

St. Louis, Mo.—A license to do business in Missouri has been granted to the Staunton Coal Co. organized under the laws of the State of Illinois with a capital stock of $300,000 and offices in St. Louis.

Richmond, Va.—The Himyar Coal Corporation has been organized in Richmond with a capital stock of from $25,000 to $50,000. T. L. Young is president, L. C. Derrickson, secretary and treasurer, both of Lexington, Ky.

Herrin, Ill.—The Herrin Coal Co. has been chartered with a capital of $4500 to engage in a mining, mercantile and manufacturing business. The incorporators are Paul B. Herrin, John Herrin, H. P. LaMaster and A. E. Elles.

Frankfort, Ky.—Articles of incorporation for the Coal, Oil and Gas Co., of St. Matthews with a capital stock of $60,000 have been recently filed. The incorporators are A. J. Fraley, of Wrigley, L. M. Render, Louisville, and John P. Haswell, Jr., of Hardingsburg.

Joplin, Mo.—The Melva Mining and Milling Co. of Joplin has filed articles of incorporation with a capital stock of $30,000. The principal stockholders are L. M. McGuire of Kansas City, J. W. Commerford, of Joplin, S. A. Kellar, of Joplin, Mark Ramsey, of Joplin.

Charleston, W. Va.—The Profound Number Five Coal and Mining Co. has been organized at St. Albans for the purpose of operating coal mines in Boone County. The capital stock is $60,000 and the incorporators are J. F. Thompson, Dr. A. E. Winters, R. M. Figman, W. B. Lauder, W. H. Lauder and I. G. Williams.

Toronto, Canada—An adjourned special general meeting of the shareholders of the Intercolonial Coal Mining Co., Ltd., was held at Montreal on Dec. 18. The Board of Directors reported that satisfactory financial arrangements had been effected for carrying on the operations of the company without the necessity of issuing any further securities at present. D. Forbes Augus having resigned the presidency, Charles Fergie, M. E., was elected president and managing director.

INDUSTRIAL NEWS

Wilkes-Barre, Penn.—The old Enterprise mine in Plains Township, which was abandoned on Nov. 18, 1889, will shortly be reopened.

Pottsville, Penn.—Engineers have recently made surveys at the Ellangowan and Suffolk collieries with the intention of taking a thousand feet of coal from the former to the latter's opening.

Indiana, Penn.—A $60,000 coal deal between the Operators Coal Co., of Johnstown, and the residents of West Wheatfield Township, has just been consummated. Work will be started shortly on the opening of a mine with New Florence as the center of operation.

Fairmont, W. Va.—A team from the Consolidation Coal Co. and one from the Jamison Coal & Coke Co. have finished the work given by those in charge of Mine Rescue Car No. 6, of the U. S. Bureau of Mines, now located at Chiefton. Both teams showed much natural aptitude for the work.

Birmingham, Ala.—The Pratt Consolidated Coal Co. will furnish the New Orleans Street Railway, Light & Power Co. with its coal for the coming year. This contract calls for 125,000 tons, and the needs will likely go to 175,000 tons. Shipments will be made daily beginning the first of January.

Briceville, Tenn.—The Knoxville Iron Co. offers for sale as a whole for cash its Cross Mountain Mine, at Briceville, Anderson County, Tenn., and all real estate appertaining thereto or used in connection therewith including houses, commisaries, mules, cars, chutes, engines, boilers, stables, feed and all other equipment.

Charleston, W. Va.—Governor Hatfield will likely be called upon to settle a controversy existing between the Signal Knob Coal Co. of Ansted, and the miners who have been on strike since Sept. 1. The conciliation board failing to reach an agreement on the matter has ordered that the case be presented to the governor for adjustment.

New Orleans, La.—The Alabama & New Orleans Transportation Co. has just launched at its ship yard near New Orleans, the fifth of its steel coal barges. These boats are self-propelling and have a capacity of 1000 tons each. The sixth barge is nearing completion and will be launched in the near future. Several additional barges have been started.

Belvidere, Ill.—The Chicago & Northwestern R.R. is storing coal in the local yards at the rate of five cars per day and will continue to thus accumulate fuel until 10,000 tons are in storage. This action is taken by the transportation company as a precaution against a possible strike of the miners next spring when new contracts are to be drawn up.

Pittsburgh, Penn.—With the close of navigation on the Great Lakes, railroads operating to ports on Lake Erie having little use for their coal and ore cars are trying to induce the iron mills in Ohio and Pennsylvania to make use of them. Unfortunately the need of cars for immediate shipping purposes for this class of traffic has lessened considerably and it is not easy to obtain such freight.

Charleston, W. Va.—Antonio Cirvallo and others who sued the Cabin Creek Consolidated Coal Co. for $15,000 for alleged injuries in being ejected from company houses during the recent strike in that section, lost their case recently. It was alleged that the wife of an Italian was mistreated and that the company had employed a number of guards to eject the miners. It took the jury but a short time to reach the verdict of "not guilty."

Pomeroy, Ohio—The leasehold and all the equipment of the Hartford Coal & Mining Co. was recently sold by the deputy sheriff to satisfy a judgment in favor of the Pomeroy National Bank for $5,577.50. There were three other judgments outstanding against the company, which run the total claims up to about $6000. The property and leasehold were offered as a whole and were purchased by E. D. and Mrs. Jennie M. Newton for the sum of $6500.

Columbus, Ohio—According to State Senator J. B. Dollison, of Logan, Ohio, practically every coal mine in the southern part of the state has closed because the operators are unable to compete with those of West Virginia by reason of discriminatory freight rates. The senator estimates that 10,000 men are out of employment. The State Public Utilities Committee has been ordered to investigate the charge of alleged discrimination in freights.

Pineville, Ky.—Announcement has been recently made that a deal has been consummated between the Continental Coal Corporation and certain Tennessee parties by which the latter have taken over three coal mines at Four Mile, on Jellico Creek. More than $1,000,000 is involved in the deal. The new corporation will be known as the Four Mile Coal Co. and W. M. Woods, who has operated mines in this district, will be the manager of the new concern.

Charleston, W. Va.—Photographs and motion pictures are being made to play a part in the educational system now being developed by the coal operators in West Virginia to lessen the number of mine accidents, increase efficiency at the mines and add to the earning capacity of the miners. Although this is by no means a new idea, it is said that in no other way have the companies been able to bring home to the men the danger and the need of caution.

Charleston, W. Va.—The report of Earle Henry, Chief of the Bureau of Mines, recently made public, shows one death from accident for every 700,000 tons of coal mined in six of the coal-producing counties of West Virginia during the first eleven months of 1913. In ten coal counties, there were no deaths from mine accidents. Total deaths in the mines of the state number 309 compared with 340 for the same period last year, the number of miners employed being increased approximately 5000.

Helena, Mont.—The Montana State Railroad Commission has started to investigate the coal rates charged by the Great Northern R.R. from the Bear Creek and Roundup coal districts to the various cities of that state. The first hearing will be held at Billings on Jan. 6. The investigation is started by the commission on its own motion, because of the complaints it has received from residents of the state who desire to use Montana coal, but on account of the excessive rates, are forced to use either Canadian or Wyoming coal.

Columbus, Ohio—A mine-rescue car, equipped with all the latest appliances for rescuing miners entombed as a result of explosions, cave-ins, or other causes, has just been purchased by the state utilities commission from the Pullman Co., of Chicago, for $3000. The new car is to be delivered just as soon as completed. It will be equipped with a naptha tank, 12 sets of oxygen breathing apparatus, 1 recharging device, 12 extra oxygen cylinders, 40 approved safety lamps and in fact everything necessary to aid the rescuers in saving the lives of entombed miners.

St. Louis, Mo.—The Missouri Supreme Court, in an opinion, declined to rescind the contract under which Miss Anna B. Haldiman, of Versailles, sold to Jos. E. Ryan and C. C. Magenheimer, 5111 acres of land in Morgan County, Mo., for $55 an acre. The two above mentioned plaintiffs and the Morgan County Coal Co. sued to rescind the deed upon the ground that the defendant, through her agents, represented to them that the land was underlaid with coal, and it later developed that it was not. The court directs a verdict of $31,920 for the defendant, claiming the plaintiffs waited too long before suing and before they made tests to determine whether or not the property was underlaid with coal.

Coal Trade Reviews

GENERAL REVIEW

Lower temperatures and holiday curtailment at the mines inject a better tone into hard coal, although market is still heavy. Production may be further restricted. Softening tendency in bituminous continues. Considerable coal on hand and indications point to a slow recovery.

Under the combined influence of a heavily curtailed production over the holiday period, and a sharp decline in temperatures, the general tone of the anthracite trade is improved. Consumers are evidencing some interest in supplies and coal is moving more freely. Conditions are, however, generally unsatisfactory. The customary holiday demand failed utterly to materialize, with the result that the companies still have large stocks on hand, and a further curtailment in mining will be necessary unless the situation is relieved by a long period of cold weather.

There has been little change in the soft coal situation and the trade rounded out the year in poor form. Business is dull and heavy, and in distinct contrast to the summer and early fall. While prices have been tentatively held at some points, the general demand is so light that there has been a perceptible tendency toward a further softening. The holidays have apparently retarded industrial demands. The only encouraging feature is the reduced production over the holiday period, and consequent light shipments to the consuming markets. A comparatively long period of fairly cold weather will be necessary to reëstablish the trade on a firm basis.

Mine operations in the Pittsburgh district were much reduced over the holidays, but general industrial and manufacturing were equally curtailed; while prices are fairly well maintained, there are heavy offerings at the circular and indications point to a further decline. Ohio mines have scarcely worked 50% capacity during the past two weeks, but even under these conditions it has been difficult to place the tonnage. Optimistic reports indicate a greater industrial activity after the first of the year, but more seasonable weather conditions will be required to put the domestic business on a firm basis. Prices are comparatively steady with cutting confined principally to the smaller companies.

Some hard winter weather has injected a slightly better feeling into the Southern trade, although this has not been of sufficient duration yet to be felt in the operating departments. An important increase in the freight rate on coke to the Western smelters created a slight flurry on the part of consumers desirous of accumulating stocks at the old schedule. Colder weather has also stimulated business in the Middle Western market, but with unusually large supplies on hand and a scarcely perceptible demand, the recovery will be slow. The trade has seldom ever reached such a low ebb in the fall of the year, and the only encouraging feature is the fact that prices have shown such a stubborn resistance on the decline. With more cheerful reports regarding general industrial conditions after the first of the year, there is a better tone in the market than for some time.

EASTERN MARKET

NEW YORK

Improved tone to anthracite under more seasonable weather conditions and curtailed mining. Stocks on hand still heavy. Bituminous holding moderately firm in spite of the large amount of coal at tide and a generally light demand.

Anthracite—Reports show that the stocks in the hands of the retail dealers are still heavy, and buying in consequence is light on all of the domestic sizes, but continuance of the cold weather will, no doubt, stimulate buying. The general tone under the improved weather conditions is much better. The storage capacity of most of the local dealers is such that large stocks cannot be carried to advantage, and the business is effected almost directly by temperature changes.

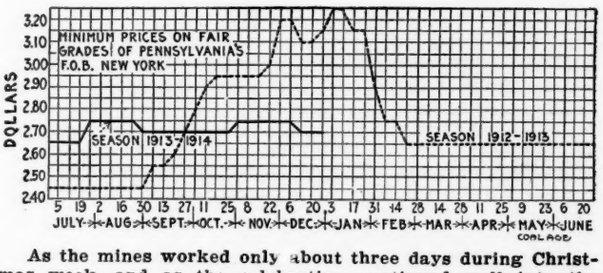
Egg contnues to be the weak size, selling as much as 50c. off circular in some cases where offered alone. Stove and chestnut are moving fairly well at, or about circular prices. Pea continues quite active on the line, but is not strong at tidewater. No. 1 buckwheat is easy, while No. 2 and No. 3, more especially in the high grades, are short; in poorer grades, Schuylkill and Lehigh, are offering freely.

Most of the operations closed down from Christmas eve until Monday. Some endeavored to work Friday and Saturday, but the men did not come out in large numbers and the result was practically no tonnage. Under present conditions, stoppage of this kind is healthy for the business; as there will probably be a recurrance of this situation over the New Year holidays, conditions should be much better after first of the year.

We quote the New York market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$5.05	
Egg	5.25	$5.25@5.35	5.30	$4.75@5.20
Stove	5.25	5.25@5.40	5.30	5 20@5.35
Chestnut	5.50	5.40@5.50	5.55	5.35@5.45
Pea	3.50	3.40@3.50	3.50	3.35@3.45
Buckwheat	2.75	2.70@2.75	2.45@2.70	2.25@2.70
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

Bituminous—The soft-coal situation remains practically the same. There is a considerable amount of coal on hand at New York loading ports, but prices have not changed materially even in the face of the light demand. The general embago on shipments to South Amboy was lifted 24 hr. after it had been in effect, and only a few of the shippers are now subject to the restriction.



As the mines worked only about three days during Christmas week, and as the celebration continued well into the current week, arrivals at tide are now light. The normal winter weather in the mining regions and colder temperatures in the consuming centers should have a beneficial effect on the situation.

Pending the probable increased demand, due to the approach of the period for negotiations between the miners and operators on the subject of the new scale of wages, to be effective Apr. 1, the only stimulus is likely to come from more severe weather conditions. Quotable prices remain as follows:

West Virginia steam, $2.60@2.75; fair grades of Pennsylvania, $2.70@2.80 good grades of Pennsylvania, $2.80@2.90; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

PHILADELPHIA

Anthracite fails to show any improvement in spite of curtailed mining and more seasonable weather. Large stocks still on hand and further curtailment in production seems probable.

Despite the fact that there has been curtailed mining, and some more seasonable weather the expected increased demand for coal has not materialized. It is true that the enforced reduction in the output has taken care of some surplus that had accumulated, but it was not found necessary to dip into stocks on the ground. Anthracite men are at a loss to explain the slump in the market, particularly at this season of the year. It is understood that many of the companies still have large stocks of pea coal on hand which have usually disappeared by this time in normal years.

It is certainly a fact that within the last ten years, no such experience has been undergone as characterize conditions now. Even stove coal has become easy, in the face of reduced output. Unless there is a continuous spell of cold weather for at least a month, conditions are in no way likely

to improve. The dealers in general seem to have ample supplies of all sizes of coal, many of them complaining that their stocks hardly give them a chance to move around. The advance in prices effective about the first of December, still continue to be generally observed by the retail trade. Further curtailment of mining is likely, if conditions do not improve in the near future.

Bituminous trade still continues to hold forth no promise, and good coals are being offered at prices that hardly show a profit for the mining. Large quantities are still coming to market, and are practically forced on the consumer by prices that they can hardly resist. It looks as though the same conditions that will add a little snap to the anthracite, will stir up things in the bituminous as well, and until that time comes, no improvement is looked for.

BALTIMORE, MD.

Year closes in dull form. Mine production cut due to holidays. Prices are still uncertain, and the demand light. Colder weather helps anthracite trade.

Soft coal interests rounded out the last week of the year 1913 in rather dull form. The state of the trade was a distinct contract to the busy period during the summer and the early fall, which contributed to make the year a successful one as a whole. The holidays cut heavily into mine production, Christmas week being light in all regions. This was rather welcomed all along the line, however, in view of accumulations that have begun to show up.

Prices are fluctuating badly, as was the case last week. Slack has taken a new slump, and was offering in West Virginia as low as 65 and 70c. Gas run-of-mine was around 80c. and three-quarter at 85c. to the trade. Best Georges Creek could be bought at about $1.50, and other fine Pennsylvania coals that were selling a few weeks ago at $1.40 to $1.45 are offering at $1.25. Demand continues light, the holiday season having apparently still farther retarded the industrial situation generally.

Coke is heavy, Connellsville furnace selling down to $1.85 in some instances, and West Virginia furnace 10 to 15c. off that low price.

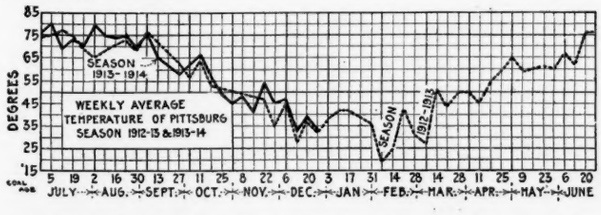
A number of foreign loadings were recorded the last month of the year, and it is expected that the export figures will run about 200,000 tons in excess of those of 1912.

CENTRAL STATES

PITTSBURGH, PENN.

Coal demand light and prices somewhat unsteady; mine operations reduced on account of the holidays. Connellsville furnace coke stronger than expected, with some sales for 1914 at $2. Foundry coke slightly easier.

Bituminous—Mine operations were at a reduced rate last week, on account of the holiday celebration, and probably less than 50% of the full tonnage was shipped, against a rate of about 60% maintained before the holiday interruption. Demand from manufacturers has been particularly light in the aggregate as a great many mills closed over the holidays and domestic demand has been light except for a little spurt in the past two or three days. Prices are fairly well maintained, but there are heavy offerings at the regular level, which we continue to quote as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.



Connellsville Coke—The furnace coke market is doing much better than expected. The offerings of coke at less than the $2 price asked by a majority of operators proves insufficient for the demand, partly because a considerable portion of the lower priced material is not altogether up to standard in quality, and several purchases have been made at the full $2 figure, though as a rule for only January or three months. However, one operator is refusing to sell beyond March at the figure, using $2.10 for second quarter. In the past week prospects have been that the cheap coke would all be cleaned up and the market firmly established at $2, but latest information is that Corrigan, McKinney & Co., whose requirements for their six blast furnaces amount to about 75,000 tons a month, have decided to blow out their five active stacks at once, presumably because they are unwilling to pay prices asked for coke. Foundry coke has softened about 10c. We quote: Prompt furnace, $1.75@1.85; contract furnace, $1.90@2; prompt foundry, $2.40@2.65; contract foundry, $2.40@2.65, per ton at ovens.

The "Courier" report production in the Connellsville and lower Connellsville region in the week ended Dec. 20 at 284,964 tons, a decrease of 22,826 tons, and shipments at 278,355 tons, a decrease of 27,490 tons.

BUFFALO, N. Y.

Better coal weather, but still no great activity. Reports show that dealers and consumers are overstocked with both anthracite and bituminous. Slight move in coke. Christmas shutdown will relieve the tension in the market.

Bituminous—There is a showing of more seasonable weather and the feeling is better, but dealers find that there is such an overstock of all sorts of coal that it will take a long time to establish a really firm basis. The bituminous trade has been pushed so much more actively than conditions justified that buyers have no room to store more coal. This is reported from all sides.

There is not much coal being produced now and it is estimated that there will be a shutdown in all the Pennsylvania districts that should amount to a full week; this will do something toward relieving the tension. Shippers now say that there is nothing that will help the situation now but weather severe enough to increase the consumption very materially.

There is not much unsold coal on track here and some jobbers report the filling of good-sized orders. While the railroads are not taking coal in large amounts some of the mines are able to keep going on railroad orders alone. The bituminous market is at least no weaker than it was, the basis remaining as before.

Coke—There is a report from Connellsville that the situation has improved a trifle in the past week. The demand is somewhat heavier and shippers are refusing to take long-time contracts. This is the first indication of improvement in coke for a long time and it is to be hoped that it will continue. The prices are on a basis of $4.60 for 72-hr. Connellsville foundry.

Anthracite—There is a slight stir in domestic sizes of anthracite and if cool weather should continue the market would right itself soon. Still some of the shippers report considerable amounts on track which they must dispose of to avoid demurrage. The surplus that comes here can go into lake vessels for the winter, but the shipping agents much prefer to sell it now, at the higher prices. After Feb. 1 anthracite is to be placed completely on the demurrage list; the practice of allowing it to stand on track indefinitely in case it is waiting for reconsignment will not be permitted any longer. It is hard to understand why such coal has ever been exempted. Four or five lake cargoes for winter storage have so far been loaded, all by a single shipper, with more tonnage under charter.

COLUMBUS, OHIO

Combination of the holiday season and continued mild weather has made trade quiet. Dealers in all sections are over-supplied and domestic trade is dull. Let-up in steam business and cessation of lake shipments have affected the trade in all districts.

Many operators in Ohio closed their mines the day before Christmas for the remainder of the week. Others, who tried to operate, were generally without orders and the production was at a low point. In the Hocking Valley field the output is estimated at 40 per cent. and the same percentage is reported from the Pomeroy Bend district. In eastern Ohio there was also a scarcity of orders and 35 per cent. will cover the production. The other fields produced only a small part of the usual tonnage.

Prices have remained rather firm at the levels which have prevailed for some time. The larger operators are not disposed to cut quotations below the circular but the smaller fellows are shading prices and as a result the coal that is moving, outside of contracts, is at lower figures than the circular.

Stopping of many manufacturing enterprises during the holiday season together with the general slow-up in business has affected the steam trade adversely. Railroads are not taking much fuel at this time because of the small movement. It is believed there will be an improvement in business soon as many plants may resume operations after the holiday season.

Retail trade is slow because of the continued unfavorable weather. There is a good demand for some fancy grades but this will probably be only temporary unless the weather becomes more favorable. Bins are full and most of the large users have laid in their supply of fuel for the winter. The market is now entirely at the mercy of the weather.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.85 @ 1.75	.....	$2.00 @ 1.85	$1.70 @ 1.60
3-4 inch	1.65 @ 1.60	$1.20 @ 1.15	1.80 @ 1.70	1.50 @ 1.45
Nut	1.40 @ 1.30	.....	1.65 @ 1.55	1.40 @ 1.30
Mine-run	1.40 @ 1.30	1.10 @ 1.05	1.30 @ 1.25	1.40 @ 1.30
Nut, pea and slack	0.80 @ 0.75	.....	0.90 @ 0.85	0.80 @ 0.75
Coarse slack	0.70 @ 0.65	0.90 @ 0.80	0.80 @ 0.75	0.70 @ 0.65

DETROIT, MICH.

Some activity in domestics but trade generally quiet. Steam consumers out of the market. Operators holding prices moderately firm.

Bituminous—A number of manufacturers have closed down, while others are running on short time so that steam business is at a minimum. Consumers are showing no disposition to accumulate surplus stocks while in some instances consignments arriving on contracts are being refused.

Some improvement is noticeable in domestic grades, but stocks are large and generally speaking dealers are prepared for almost any emergency that may arise. Operators and jobbers are making determined effort to maintain circular quotations, but prices are unsteady on all grades. Smaller companies are showing a tendency to force business by cutting prices and while nominal quotations are: $1.85@$2 on the Hocking domestic lump, with Pomeroy at $2.15@2.25, and Kanawha $1.75, any of these grades can usually be had for prompt shipment at $1.40.

The market is quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.75	....	$2.00	....	....	$2.50	$2.50
Egg	1.75	....	2.00	....	....	2.50	2.50
Nut	1.10	....	1.15	....	....	....	....
Steam lump	1.20	....	....	....	....	....	....
3-in. lump	1.10	$1.10	1.10	$1.10	$1.10	....	....
Mine-run	1.00	1.00	1.00	1.10	1.10	1.40	....
Slack	0.85	0.85	0.65	0.80	0.75	....	....

Anthracite—Consumers all appear to be over-stocked on hard coal and demand has ceased entirely. The trade is marking time pending the arrival of more continued cold weather.

LOUISVILLE, KY.

Some hard winter weather has injected a better feeling into the trade. Effects not yet felt in the operating departments which are under curtailed production because of the holidays.

Christmas brought a pronounced cold snap, which made people realize that winter had arrived. A good deal of snow fell, accompanied now and then by a freezing rain, and the weather has held well since, so that the trade is looking forward confidently to some real business from now on.

As yet the demand expected to result from the improved weather conditions has not materialized, which is just as well considering the usual holiday lay-off at the mines; little coal has moved of late, so that the market condition fitted in nicely with the small supplies available. The relatively light demand reported by the retail trade indicates that the stocks laid in early in the season are, in most instances, still on hand. This will hold up the demand for a few days, but the trade is bound to feel the effects of the improved consumption shortly.

Domestic prices have shown a stiffer tendency as a result of better prospects for business, quotations for January delivery of good Eastern Kentucky coal being $2.25 for block, $2 for lump and $1.75 for egg. The steam market is in a rather anomalous state, due largely to the dealers themselves. The low production of the prepared grades has kept down the amount of screenings available, which has maintained prices but in spite of this some dealers have recently shown signs of making concessions. This condition will probably disappear, however, with a more active movement of domestic, and a continued upward tendency on both sides of the market may be expected.

SOUTHERN AND MIDDLE-WESTERN

BIRMINGHAM, ALA.

Little change in the coal market. Furnace coke somewhat more active with larger shipments. Pig iron quiet, though price holding firm at $11. Car supply shows improvement.

The coal markets, both steam and domestic, show little change over last week. There is small demand for either grade, though lump coal has slightly improved. The usual holiday business did not materalize, which was a disappointment to the operators; ordinarily the mines are rushed to full capacity during this time, and while a few companies had orders for extra billing, the operators as a whole received no benefit. A good many of the mines are closed down for a few days, the producers taking advantage of the quiet market and not asking their men to report back for work until Dec. 29.

Due to the advance of $2 per ton on coke to Western points, which goes into effect on Jan. 1, many of the Western smelters have placed orders for a good tonnage of furnace coke for shipments prior to that date, and this has greatly assisted in keeping the coke market in a satisfactory condition. Foundry coke is quiet, and some producers are offering 72-hr. foundry as low as $3.75. The regular price is from $4 to $4.25 per ton. No large sales of pig iron are being made, though many small orders for prompt shipment are coming in. The price is holding up on the basis of $11 for 2F f.o.b. Birmingham.

Due to the quiet trade, and the fact that many of the mines closed down for a few days during the holidays, the car situation shows some improvement.

INDIANAPOLIS

Little change in situation. Mild weather continued almost to the end of December. Sentiment more cheerful at coming of January. Prices unchanged.

The month of December was an unusual one in its mildness and it is seldom that so little coal is necessary. The one comforting condition to the trade was that prices held up. It seemed useless to cut them for buyers simply did not need the coal and were afraid to take on more, even at low figures. This was not true of screenings at first and they were practically given away but the slow demand for the larger coal finally compelled the closing of mines; then screenings and other steam grades became scarce and prices were pulled back to somewhere near normal.

As railroads were retrenching near the end of the year, so that their annual reports might make as good showing as possible, there may be improvement in the service from now on. Under the urgings of the Indiana Public Service Commission, the railroads have succeeded in relieving the congestion at important points and the situation is quite favorable as the new year starts. Industrial conditions are not bad locally and an optimistic tendency is noticed since the currency question was settled.

The year 1913 will be easily remembered by coal men because of the unparalleled floods in March that carried away much coal, shut down factories and filled mines with water. In this city, two memorable strikes occurred and few of the coal men will forget the summer weather that continued up to Christmas.

CHICAGO

Return of lower temperatures brightens outlook for coal dealers. Expected that recovery from dull conditions will be slow. Little demand for lump coal and screenings market is not strong. Small amount of anthracite being disposed of and few sales of Hocking. Smokeless dealers report slack business. Coke market slow.

Return of colder weather has brought Chicago coal dealers hope for greater briskness in business, although it is expected that the recovery will be slow. Conditions in nearly all lines continue unsatisfactory.

The demand for lump coal is scarcely noticeable, all dealers having their bins well stocked; few operators are producing much in the larger sizes. There are unusually large supplies of anthracite in the hands of the dealers and the demand continues light. Little of this coal is being forwarded from the docks to the interior. Standard shippers of Hocking are maintaining the circular price of $2 a ton with few sales being recorded. Other producers have offered $1.50 on shipments direct from the mines, but this inducement has not resulted in materially increasing sales. Some free coal up to car service has been sold as low as $1.40.

Carterville operators report that conditions are stationary. Some of them are running their mines on a steam-coal basis or have closed down where no orders for the output are on hand. In the Springfield market most of the domestic coal is being held at $1.50. Many of these producers are closing down rather than ship on consignment. Some improvement has been noted in the demand for screenings.

Weakness prevails in the smokeless lump and egg market and some producers will ship a car of lump and egg on a mine-run order rather than shave the price. There is better call for the mine-run as there is a continuous demand from apartment house owners. Standard shippers have kept the

mine-run price at $1.40, while some thin vein and off-grade coal has been disposed of at $1.25. The market for screenings would be better if factories were not running on short time.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.32	$2.45@2.80	$2.27	
Steam lump	1.97		1.97	
Egg		2.45@2.80		$4.30
Mine-run	1.87	2.30	1.87	3.45
Screenings	1.42	1 75@1.85	1.37	

Quotations on Harrisburg coal are: Domestic lump and egg, $2.55@2.85; steam lump, $2.25; mine-run, $2.25; screenings, $1.75@1.85; No. 1, nut, $2.55@2.85; No. 2, nut, $2.55.

Carterville prices are: Lump, egg and No. 1 washed, $2.55@2.85; No. 2 washed, $2.55.

Coke—Connellsville, $5.25@5.50; Wise County, $5@5.25; byproduct, egg, stove and nut, $4.90@5; gas house, $4.75@4.85.

ST. LOUIS, MO.

Indications point to an advancing market. Weather colder with good future prospects for domestic inquiries. Steam sizes holding up good. On anthracite, coke and smokeless the market is slow and soft.

A little colder weather caused a toning up of the market during the last days of the year. The first snow came Christmas Day, and while it was only light, it seemed to have the effect of helping business along, and the dealers received orders; while they were not large ones, they were still sufficient to keep things moving, and there has been a slight demand for all grades of domestic coal. It has not made the market as good as the operator would like, but coal is moving which is something that could not be said for it for the past two or three weeks.

There seems to be a little demand right now for anthracite, and strange to say it is somewhat hard to get, although but a week or ten days ago the market was demoralized. Coke is heavy, with no chance of picking up, and the same applies in a way to smokeless.

In the local coals, screenings from both the Carterville and Standard fields are still holding up, the former at 60 to 65c. and the latter at 45 to 50c. the mines. The nut sizes are dragging; No. 1 raw has gone as low as $1, under demurrage, and No. 2 at 90c., but the general market is considerably better.

Indications are that after the first of the year there will be a stiffening up on all sizes, and operators are not selling much in advance.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$0.95@1.10
3-in. lump	.....	.....	$1.40	.....
6-in. lump	$1.25 @ 1.50	$2.25	1.50	1.15@1.25
Lump and egg	1.85 @ 2.15	.....	.....	.....
No. 1 nut	1.15 @ 1.40	.....	.....	.....
Screenings	0.40 @ 0.50	.....	.....	.....
Mine-run	1.10 @ 1.20	.....	.....	.....
No. 1 washed nut	1.75 @ 1.90	2.25	1.60	.....
No. 2 washed nut	1.35 @ 1.50	.....	1.25	.....
No. 3 washed nut	1.15	.....	.....	.....
No. 4 washed nut	1.05	.....	.....	.....
No. 5 washed nut	0.50	.....	.....	.....

Franklin County and Carterville 6-in. lump and 3x6 egg, $1.25@1.50; No. 1 nut, $1.15@1.40.

Quotations on anthracite are: Chestnut, $7.54; egg and stove, $7.28; grate, $7.02.

Smokeless lump and egg is quotable at $4.75@5.

Gas house coke is $4.85@5 with byproduct $5 to 5.15.

KANSAS CITY, MO.

Little activity over the holidays. Colder weather depleting stocks and outlook is brighter. Mine operations heavily curtailed.

Though the past week saw little activity in mining circles of Kansas and Missouri, the prospects are now regarded as being a decided improvement over those of the last couple of months. The weather is more favorable and dealers' stocks are being rapidly depleted. This heavier consumption is expected to affect wholesalers, early in the near year, dealers apparently having waited for the turn of the year before renewing their stocks. Few mines have worked more than half time during the holidays, while many operated only at about one-fourth of their capacity.

The market has held steady but an advance is likely, if the situation continues to improve. Residents of Missouri and Kansas have practically abandoned their efforts to burn gas for fuel, and coal will be used almost exclusively, both for domestic and commercial use during the winter, in marked contrast to the conditions in previous years.

PORTLAND, ORE.

No change in market conditions although demand is a little stronger due to the colder weather.

There has been no material change in the coal market here excepting perhaps that the demand is a little stronger with the advance of winter. So far little really cold weather has been experienced here as yet, but in anticipation of what may follow soon after the first of the year, supplies are being laid in to last through the colder months, January and February.

The Monarch Coal Company which operates a new mine in the vicinity of Centralia is now shipping coal into this territory. It has established an office and the retail prices are: Lump, $6; egg, $5.75; nut, $5.50.

PRODUCTION AND TRANSPORTATION STATISTICS

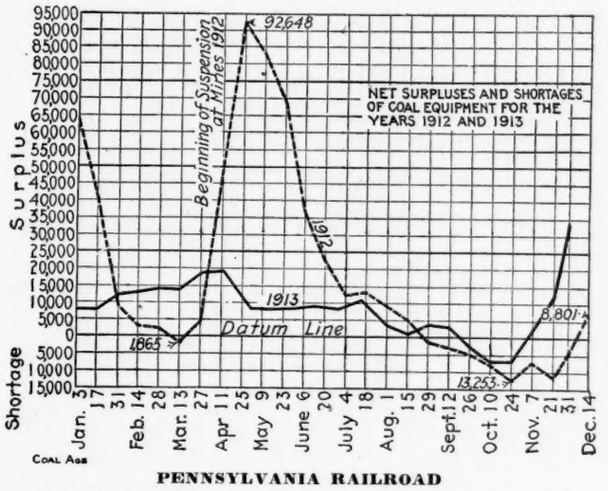
THE CAR SITUATION

American Ry Association reports surpluses and shortages of coal equipment for two weeks ended Dec. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	175	0	**175**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	2,062	0	**2,062**
Ohio; Indiana; Michigan; Western Pennsylvania	18,201	0	**18,201**
West Virginia, Virginia, North & South Carolina	689	2,124	**1,435**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	3,824	31	**3,793**
Iowa, Illinois, Wis., Minn.; North & South Dakota	5,878	2	**5,876**
Montana, Wyoming, Nebraska	118	18	**100**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,882	50	**1,832**
Texas, Louisiana, New Mexico	420	23	**397**
Oregon, Idaho, California, Arizona	3,186	47	**3,139**
Canadian Lines	0	0	0
Total	36,435	2,295	**34,140**

	Aug. 15	Sept. 1	Sept. 15	Oct. 1	Oct. 15	Nov. 1	Nov. 15	Dec. 1
Surplus	8,293	8,689	8,714	7,953	6,014	6,720	10,520	17,621
Shortage	7,038	5,209	7,731	10,393	12,502	12,595	8,477	5,095
Net*	**1,255**	**3,480**	**983**	2,440	6,488	5,875	**2,043**	**12,526**

***Bold face** type indicates a surplus.



PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for November and first eleven months of this year and last year in short tons:

	November		Eleven Months	
	1913	1912	1913	1912
Anthracite	987,487	916,914	9,699,210	9,275,631
Bituminous	4,509,375	3,934,876	47,171,538	42,162,485
Coke	999,500	1,245,500	13,011,863	12,128,463
Total	6,496,362	6,097,290	69,882,611	63,566,579

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for November and the first eleven months of this year and last year:

	November		Eleven Months	
	1913	1912	1913	1912
Coal	2,939,975	2,864,734	32,091,742	29,140,169
Coke	343,387	435,001	4,350,800	4,318,122
Total	3,283,362	3,299,735	36,442,542	33,458,291

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during October and the first ten months of this year in comparison to last year, in short tons:

	October		Ten Months	
Anthracite	1912	1913	1912	1913
Baltimore & Ohio[1]	184,252	166,214	1,267,222	1,226,938
Chesapeake & Ohio[1]	1,440	1,645	20,711	14,639
Erie[3]	761,360	794,528	6,202,725	7,283,826
Pennsylvania[1 3]	970,880	1,046,703	8,358,717	8,711,723
Virginia[2 1]	77	50	97	909
Total 5 roads	1,918,009	2,009,140	15,849,472	17,238,035
Bituminous				
Baltimore & Ohio[1]	3,038,407	3,401,618	28,431,931	30,652,147
Buffalo, Roch. & P.[1 2]	812,418	985,223	6,827,271	8,037,988
Buffalo & Susq.[1 2]	157,493	168,148	1,246,422	1,507,341
Chesapeake & Ohio[1]	1,362,680	1,570,072	14,480,895	14,188,105
Erie[3]	14,609	13,298	220,070	319,764
Hunt. & Br'd T. Mt[1 2]	129,111	127,898	1,011,737	1,135,294
New York Central	814,144	889,153	6,667,903	7,658,720
Norfolk & Western[1 2]	1,939,772	2,098,241	19,048,864	20,037,498
Pennsylvania[1 3]	4,113,550	4,887,840	38,227,609	42,662,163
Pitts. & Lake Erie[1 2]	1,158,203	1,144,112	9,527,976	10,812,407
Pitts. Shaw. & North[1 2]	218,387	270,174	1,619,271	2,307,343
Virginia[1 2]	338,518	476,482	2,950,100	3,768,423
Western Maryland	207,829	248,858	2,322,620	2,459,414
Total 13 roads	14,305,121	16,281,117	132,582,669	145,546,607
Coke				
Baltimore & Ohio[1]	433,547	383,337	3,932,524	3,667,855
Buffalo, Roch. & P.[1 2]	57,673	32,059	442,220	445,162
Buffalo & Susq.[1 2]	29,184	30,965	227,664	255,503
Chesapeake & Ohio[1]	25,060	33,035	213,087	299,921
New York Central	7,812	.....	72,937	36,207
Norfolk & Western[1 2]	131,007	111,020	1,197,943	1,287,622
Pennsylvania[1 3]	1,211,620	1,152,950	10,882,963	12,012,363
Pitts. & Lake Erie[1 2]	587,638	567,661	5,171,735	5,750,552
Pitts. Shaw & North[1 2]	.....	.....	5,155	9,383
Western Maryland	5,986	4,892	57,624	64,115
Total 10 roads	2,489,527	2,320,919	22,203,852	23,828,683
Coal and Coke, 13 Roads				
January			16,421,839	18,936,646
February			17,787,331	17,546,496
March			19,483,025	17,631,345
April			13,429,367	16,850,690
May			15,635,568	18,986,796
June			16,702,153	18,580,363
July			16,635,448	18,704,710
August			18,396,247	19,718,856
September			17,432,358	19,046,247
October			18,712,657	20,611,176
November			17,815,767	.....
December			17,929,632	.....
Total, 12 months			206,381,392	

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note.—The Southern Railway hauled 351,220 short tons of coal during September, 1913, and 3,127,282 short tons during the nine months ending September 30, 1913.

COAL FREIGHT DECISIONS

Suspension Docket No. 181—Rates on coal to Milwaukee and other Wisconsin points.

The holding of the original opinion, 27 I. C. C., 223, as to the maintenance of routes and rates for the transportation of soft coal from certain West Virginia and Kentucky mines to points on the west shore of Lake Michigan, when destined to points beyond, is affirmed. An advance of 10c. per ton in the proportional rates here in question is likewise permitted.

FOREIGN MARKETS

GREAT BRITAIN

Dec. 19—The coal market continues strong in tone with large coals scarce. Quotations are approximately as follows:

Best Welsh steam	$4.98@5.16	Best Monmouthshires	$4.44@4.50
Best seconds	4.80@4.92	Seconds	4.14@4.26
Seconds	4.56@4.74	Best Cardiff smalls	2.64@2.70
Best dry coals	4.56@4.80	Seconds	2.52@2.64

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, and for cash in 30 days.

RUSSIA

The imports of coal into Russia during the first half of 1913 totaled 2,557,000 tons, as against 1,860,000 tons in the first half of 1912; coke imports amounted to 402,000 tons, as against 309,000 tons.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Dec. 27:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	..	..	80	87	80
American Coal Products Pref.	..	..	105	109½	102
Colorado Fuel & Iron	29¾	28	29	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102½	102½	102½
Lehigh Valley Coal Sales	190	175	175	....	....
Island Creek Coal Com.	49½	47	49	53½	47
Island Creek Coal Pref.	83½	83½	83½	85	80
Pittsburgh Coal	19⅝	18⅛	18⅝	21⅜	14½
Pittsburgh Coal Pref.	87½	86⅜	87½	95	73
Pond Creek	19⅛	18⅛	19⅛	23½	16½
Reading	171½	164½	169¼	171	151¼
Reading 1st Pref.	86	86	86	92½	82½
Reading 2nd Pref.	92½	87½	91½	95	84
Virginia Iron, Coal & Coke	..	..	36	54	36

	Closing		Week's Range		Year's
Bonds	Bid	Asked	or Last Sale		Range
Colo. F. & I. gen. s.f.g. 5s	90	93	91½	Dec. '13	90 99½
Colo. F. & I. gen. 6s	102	106½	107½	June '12	.. ..
Col. Ind. 1st & coll. 5s. gu	..	78	75	76	75 85
Cons. Ind. Coal Me. 1st 5s	76	79	76	Aug. '13	76 76
Cons. Coal 1st and ref. 5s	..	92	87½	87½	87 87½
Gr. Riv. Coal & C. 1st g 6s	..	..	102½	April '06	.. ..
K. & H. C. & C. 1st s f g 5s	92½	..	92¼	Dec. '13	91 98
Pocah. Con. Coll. 1st s f 5s	..	88½	86	Oct. '13	85 87½
St. L. Rky. Mt. & Pac. 1st 5s	76	77	76	Dec. '13	73 80½
Tenn. Coal gen. 5s	96	97½	96	Dec. '13	96 103
Birm. Div. 1st consol. 6s	101½	Sale	100½	101½	100½ 103
Tenn. Div. 1st g 6s	101½	Sale	101½	101½	99 102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103 103
Utah Fuel 1st g 5s	..	..	..	....	.. ..
Victor Fuel 1st s f 5s	..	84	80	May '13	79½ 80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	Dec. '13	92 98

DIVIDENDS

Delaware, Lackawanna & Western—Regular quarterly dividend of 2½%, payable Jan. 20, to holders of record Jan. 3.

Lehigh Valley Coal Sales Co.—Regular quarterly dividend of $1.25, payable Jan. 20 to holders of record Jan. 2.

Lehigh & Wilkesbarre Coal Co.—Dividend of $3.25, payable Dec. 27 to holders of record Dec. 24.

Nova Scotia Steel & Coal, Ltd.—Regular quarterly of 1½% on the common and 2% on the preferred, payable Jan. 15 to holders of record Dec. 31.

Pittsburgh Coal Co.—Regular quarterly on the preferred of 1¼%, payable Jan. 2 to holders of record Jan. 15.

Island Creek Coal Co.—Earnings of this company in September of last year were at a rate which, if maintained throughout the year, would mean profits of about $900,000 after depreciation, or about $6 on the common stock after the regular 7% preferred had been paid.

Wilkes-Barre Colliery Co.—This company is issuing $500,000 first mortgage, 6% sinking fund gold bonds. Bonds are dated Sept. 1, 1912, and due Sept. 1, 1923, but are redeemable on any interest date at 102 and interest. Bonds are guaranteed by Madeira, Hill & Co.

Canadian Coal & Coke Co.—This company having $15,000,000 capital stock, and an authorized issue of $3,000,000 bonds, has taken over the Western Coal & Coke Co., Pacific Pass Coal Field, St. Albert Collieries, and the Lethbridge Colliery. It is said the new company will issue immediately $3,750,000 preferred stock, about $9,500,000 common stock, and $2,000,000 bonds.

Consolidation Coal Co.—The total assets of this company for the year of 1912 amounted to $62,965,467 as compared with $60,409,468 for the year previous. Capital assets for the same period were $49,274,181 and $46,400,867 respectively. The surplus last year amounted to $1,144,492 which was an increase of $962,171.

Bond County Coal Co. (Illinois)—The recent first mortgage issued by this company will be secured by 12,000 acres of thick vein Illinois coal owned in fee and estimated as containing 84,000,000 tons of recoverable coal. The bonds are guaranteed by the Peabody Coal Co., of New Jersey, which has a net paid in capital, surplus and reserve of $4,028,361.

The Reading Co.—Earnings of this company for October of last year amounted to $4,641,338 which is $148,268 or 3% less than the same period in 1912. This is accounted for by the unusual activity in the trade last fall due to the shortage of some 6,000,000 tons as a result of the suspension in mining early in the year.

Index of Current Coal Literature

We will furnish copy of any article (if in print) for the price quoted. Where no price is quoted, the cost is unknown. Inasmuch as the papers must be ordered from the publishers, there will be some delay for foreign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

Monthly Statement of Coal-Mine Fatalities in the United States, October, 1913; with Revised Figures for Preceding Months. Albert H. Fay. Bureau of Mines, 1913; 17 pp.

BLASTING, EXPLOSIVES

Method of Tamping for Greater Safety in Blasting. G. Volf. Coll. Engr., December, 1913; ⅓ p. 40c.

BORING AND TUNNELING

Recent German Drilling Practice. (Translation from Zeit. f. das Berg. H. u. Salinenwesen.) Coal Age, Dec. 13, 1913; ¾ p., illus. 10c.

BRIQUETTES

A 40- to 50-Ton Coal-Briquetting Machine. Iron Coal Tr. Rev., Dec. 12, 1913; ⅓ p., illus. 40c.

The Briquetting of Flue Dust in the United States by the Schumacher Process. Felix A. Vogel and A. M. Tweedy. Trans. A. I. M. E., December, 1913; 5½ pp., illus.

COKE

Gas Exhauster for Coke Ovens. Coll. Engr., December, 1913; 1¼ pp., illus. 40c.

Koppers Byproduct Coke Ovens at Llwynpia Colliery. (This plant deals with 2200 tons of coal per week, producing about 1760 tons of coke with the class of coal used.) Iron Coal Tr. Rev., Dec. 5, 1913; 1¼ pp., illus. 40c.

Probable Future of the Connellsville Coke Region. John W. Boileau. Black Diamond, Dec. 6, 1913; 1⅛ pp., illus. 20c.

Selection of Coke Samples for Analyses. (Paper by Fred C. Keighley read before the Coal Min. Inst. of Amer.) Coal Age, Dec. 13, 1913; 1½ pp. 10c.

The Automatic Control of Byproduct Coke Oven Plants. A. Thau. Gas Wld., Dec. 6, 1913; 3 pp., illus. 40c.

The Recovery of Benzol from Coke Oven Gas. Coll. Guard., Dec. 5, 1913; 1¼ pp., illus. 40c.

COMPRESSED AIR

Air Compressors and Compressed Air Machinery. (Chapter IV of series of articles by Robt. L. Streeter.) Eng. Mag., December, 1913; 18½ pp., illus. 35c.

DRAINAGE, PUMPING, ETC.

Centrifugal Pumps. (Paper by A. Temple Thorne read before the Graduate Section of the Northeast Coast Inst. of Engrs. and Shipbuilders, Nov. 15, 1913.) Coll. Guard., Dec. 12, 1913; 1⅛ pp., illus. 40c.

Experience with Pumping Machinery. (Paper by John Brindley read before the So. Staffordshire and Warwickshire Inst. of Min. Engrs.) Coll. Guard., Dec. 19, 1913; 1 p. 40c.

ELECTRICITY

Electricity vs. Steam for Winches. Coal Age, Dec. 27, 1913; 1 p., illus. 10c.

Electric Coal Mining in Central Illinois. (The O'Gara coal mine at Sangamon County, Ill., is now producing from 800 to 1000 tons of coal daily at an average cost of $400 per month for electrical energy.) Elec. Wld., Dec. 13, 1913; 2 pp., illus. 20c.

Electricity in Coal Mining. Geo. R. Wood. Coal Age, Dec. 6, 1913; 1 p. 10c.

Electric Installations in Gaseous Mines. Dr. Alfred Gradenwitz. Coal Age, Dec. 27, 1913; ¾ p. 10c.

Storage Batteries for Mine Locomotives. Wm. Van C. Brandt. Coal Age, Dec. 6, 1913; 1¼ pp. 10c.

Safeguarding Electricity in Mines. (Read by Clyde G. Brehm before the Coal Min. Inst. of Amer.) Coal Age, Dec. 6, 1913; 1¾ pp. 10c.

Testing Transformers for Colliery Work. (Paper read by John Bentham before the Yorkshire Branch of the A. M. E. E.) Iron Coal Tr. Rev., Dec. 5, 1913; 1¾ pp. 40c.

The Electrical Equipment of a Modern Mine. W. R. Jones. Coal Age, Dec. 6, 1913; 2 pp., illus. 10c.

The Use of Electricity in Mines. Clyde G. Brehm. Coal Age, Dec. 6, 1913; 2¾ pp., illus. 10c.

Underground Lighting Transformer. Iron Coal Tr. Rev., Dec. 5, 1913; ⅓ p., illus. 40c.

EXPLOSIONS

Explosions in Mines. (The fifth and abstract of the remainder of the report of the Explosions in Mines Committee.) Coll. Guard., Nov. 21 and 28, 1913; 7½ pp., illus. 80c.

FUEL TESTING

Lignite Coal-Testing Plant. (Reprinted from the Public Service Monthly, Regina, Sask.) Can. Min. Jour., Dec. 12, 1913; ¾ p. 25c.

The Oxidation of Coal and of the Process of Combustion. (Address delivered by Horace C. Porter before the Amer. Chem. Soc. Sept. 9, 1913.) Can. Engr., Dec. 18, 1913; ½ p. 20c.

GENERAL

Bujun Coal Mine in Manchuria. Min. & Sci. Press. Nov. 29, 1913; ¾ p. 20c.

Coal Mining in South Africa. Coll. Guard, Dec. 12, 1913; ½ p. 40c.

Fluctuations in the Coal Trade. (Paper by D. H. Robertson read before the Royal Statistical Society.) Coll. Guard., Dec. 19, 1913; ⅜ p. 40c.

Long-Distance Steam Transmission. F. W. Brady. Coal Age, Dec. 20, 1913; 3¾ pp., illus. 10c.

Nationalization of Mines. (Address by J. Chapman before the Newcastle Economic Soc., Dec. 3, 1913.) Coll. Guard., Dec. 5, 1913; ½ p. 40c.

Purchasing Coal under Specifications. Reginald Trautschold. Coal Age, Dec. 20, 1913; 2 pp. 10c.

Reporting on Coal Properties. (Paper by Frank Haas to have been read at the W. Va. Coal Min. Inst., Dec. 8, 1913.) Coal & Coke Op., Dec. 25, 1913; 2 pp. 20c.

The Zeiss Level. (Paper by J. Husband read before the Midland Inst. of M. C. M. E.) Coll. Guard., Dec. 19, 1913; ⅜ p. 40c.

Swedish Coal Contract Specification. Iron Coal Tr. Rev., Dec. 5, 1913; ½ p. 40c.

The Origin of Coal. W. G. Burroughs. Coll. Engr., December, 1913; 3⅓ pp., illus. 40c.

The Coal Fields and the Coal Industry of Eastern Canada. F. W. Gray. Trans. I. M. E., Vol. XLVI, Part I; 36 pp., illus.

Unwatering the Frisco Mine. N. S. Greensfelder. Colo. School of Mines Mag., December, 1913; 2 pp. 30c.

HOISTING AND HAULAGE

Electric Mine Haulage. E. A. Lof. Coll. Engr., December, 1913; 5¼ pp., illus. (To be continued.) 40c.

Prevention of Overwinds at Collieries. Min. Eng., December, 1913; 2¾ pp., illus. 40c.

Shaft Gate Controlling Device. Coll. Engr., December, 1913; 1 p., illus. 40c.

The Safety of Winding Ropes. (Preliminary report of the Prussian Winding Rope Commission.) Coll. Guard., Dec. 5 & 12, 1913, 1⅝ pp. 80c.

Use of Gasoline Motors in Mines. (Paper by W. C. Whitcomb read before the Dec. 8, 1913 meeting of the Kentucky Min. Inst.) Coal Age, Dec. 27, 1913; 2¼ pp. 10c.

Winding Appliances, Winding Ropes and Capels: Past and Present. (Continuance of Discussion of A. S. Bratley's paper read at meeting of Natl. Assn. of Colliery Managers.) Iron Coal Tr. Rev., Dec. 19, 1913; 1¼ pp. 40c.

LEGAL REFERENCES

Effect of "Strike Clause" in Fuel Sales Contracts. A. L. H. Street. Coal Age, Dec. 6, 1913; 1 p. 10c.

Mining Companies and the Corporation Tax. Eng. & Min. Jour., Dec. 13, 1913; ¼ p. 25c.

The Coal Industry and the Sherman Law. (Address delivered by Chas. M. Moderwell before the Natl. Civic Federation Dec. 12, 1913.) Coal & Coke Op., Dec. 25, 1913; 1½ pp. 20c.

LIGHTING

Electric Safety Lamps. (Address by W. Maurice before the Natl. Assn. of Colliery Mgrs.) Iron Coal Tr. Rev., Nov. 28, 1913; ⅝ p. 40c.

Flame vs. Electric Safety Lamps. E. A. Hailwood. Coal Age, Dec. 6, 1913; 1½ pp. 10c.

Safety of Portable Electric Mine Lamps. (First part of paper read by H. H. Clark at the Dec. 5, 1913 meeting of the Coal Min. Inst. of Amer.) Coal Age, Dec. 27, 1913; 2 pp. 10c.

Some Notes on Mine Lighting. R. S. Iremonger. Coal Age, Dec. 6, 1913; 1½ pp., illus. 10c.

The Difficulties Involved in Adding a Gas Detector to Portable Electric Lamps. Sydney F. Walker. Iron Coal Tr. Rev., Nov. 28, 1913; ⅝ p. 40c.

The Physiological Characteristics of Acetylene with Relation to Its Use as an Illuminant in Mines. (Paper read by Dr. E. E. Smith at recent meeting of the Intl. Acetylene Assn.) Can. Min. Jour., Dec. 15, 1913; 4¼ pp. 25c.

MINING COSTS

Analyzing the Mine Cost Sheet. J. B. de Hart. Coal Age, Dec. 6, 1913; ¾ p. 10c.

MINE FIRES

Discussion of Henry Rowan's Paper on Underground Fires. Trans. I. M. E., Vol. XLVI, Part I; 6 pp.

Spontaneous Combustion in Coal Mines. (Evidence before the Departmental Committee.) Iron Coal Tr. Rev., Nov. 21, 28, Dec. 5 and 12, 1913; 7 pp. $1.

Comparative Inflammability of Mixtures of Pit Gas and Air Ignited by Momentary Electric Arcs. (Discussion of Prof. W. M. Thornton's paper read at meeting of No. of Eng. Inst. of Min. & Mech. Engrs.) Iron Coal Tr. Rev., Dec. 19, 1913; ⅝ p. 40c.

MINE GASES, TESTING

Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air. (Paper by Prof. Daniel Burns read before the Min. Inst. of Scotland.) Coll. Guard., Dec. 19, 1913; ⅛ p. 40c.

Experiments with Animals in Carbon Monoxide. (Paper by Geo. A. Burrell and Frank M. Seibert read before the Dec. 5, 1913 meeting of the Coal Min. Inst. of Amer.) Coal Age, Dec. 27, 1913; 3½ pp. 10c.

PREPARATION

Coal Mining and Coal Washing in Belgium. (Papers by L. D. Ford read before the No. of Eng. Inst. of Min. & Mech. Engrs.) Coll. Guard., Dec. 19, 1913; ⅝ p. 40c.

New Principles in Anthracite Preparation. (The L. V. C. Co. at their Mineral Springs breaker has abandoned the larger sizes of lump and done away with the picker boy.) Black Diamond, Nov. 29, 1913; ½ p., illus. 20c.

Short Mountain Breaker of the Summit Branch Mining Co. (This breaker has been designed not so much as a labor saver as to prevent the degradation of coal.) Wm. Z. Price. Coll. Engr., December, 1913; 3¾ pp., illus. 40c.

RESCUE, SAFETY APPARATUS

German Rescue Organization. (Translated from Glückauf.) Coll. Engr., December, 1913; 2⅝ pp., illus. 40c.

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Improvements in Oxygen Apparatus. (From a paper by Berg. Grahn read at Intl. Life-saving Congress at Vienna, 1913.) Coll. Guard., Nov. 28, 1913; ⅝ p., illus. 40c.

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SANITATION, DISEASES

Malaria—Its Effect on Work and Workmen. H. G. F. Spurrell. Min. & Sci. Press, Dec. 6, 1913; 5½ pp. 20c.

Sanitation and Health of the Mining Community. (Address by Dr. H. A. Hatfield to the W. Va. Coal Min. Inst. Dec. 8, 1913.) Coal & Coke Op., Dec. 25, 1913; 3 pp. 20c.

STEAM ENGINES AND BOILERS

Motor-Driven and Ash-Handling Equipment at Pacific Mills, South Lawrence, Mass. Elec. Wld., Dec. 6, 1913; 1¼ pp., illus. 20c.

Notes on the Clinkering of Mixed Coals. (Paper by R. D. Quickel read before the Dec. 8, 1913 meeting of the Kentucky Min. Inst.) Coal Age, Dec. 27, 1913; 3 pp. 10c.

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Large Prime Movers and Boilers for Power Houses. (Discussion of E. Kilburn Scott's paper read at Natl. Assn. of Colliery Managers and Assn. of Min. Elec. Engrs.) Iron Coal Tr. Rev., Dec. 19, 1913; 1½ pp. 40c.

SHAFTS, SHAFT SINKING

Celymen North Colliery, Newport, Mon. (Describes sinking of first shaft, encountering at a depth of about 100 yd. a feeder of some 20,000 gal. of water.) Iron Coal Tr. Rev., Nov. 28, 1913; 1 p., illus. 40c.

Permanent and Watertight Shaft Construction in Europe and the United States. Min. Sci., December, 1913; 1¼ pp. 35c.

Removal of a Shaft-Pillar at South Kirkby Colliery. Chas. Snow. Trans. I. M. E., Vol. XLVI, Part 1; 4¾ pp., illus.

The Sinking and Lining of Shafts. Francis Donaldson. (From Proc. Engineers' Club of Philadelphia.) Min. & Sci. Press, Nov. 29, 1913; 4¾ pp., illus. 20c.

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Cable Wiring for Mine Telephones. Gregory Brown. Coal Age, Dec. 6, 1913; 2¼ pp., illus. 10c.

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A New Coal Dock at Vera Cruz, Mexico. Black Diamond, Dec. 6, 1913; ½ p., illus. 20c.

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Motor Trucks in Mining Work. R. W. Hutchinson, Jr. Eng. Mag., December, 1913; 14¼ pp., illus. 35c.

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Examples of the Use of Concrete at Collieries. John Gregory. Trans. I. M. E., Vol. XLVI, Part I; 11¾ pp., illus.

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A Pressure and Velocity Meter for Mines. Coll. Engr., December, 1913; ¾ p., illus. 40c.

Discussion of John Watson's Paper on the Testing of Fans: A Plea for Standardized Test Conditions. Trans. I. M. E., Vol. XLVI, Part I, 8 pp.

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A New Type of Coal Cutter. C. E. Warbom. Coal Age, Dec. 20, 1913; 2 pp., illus. 10c.

Obtaining Anthracite by Open-Air Mining or Stripping Process, Schuylkill Co., Penn. Coal Tr. Jour., Dec. 17, 1913; ½ p., illus. 35c.

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